DANA SPICER®
Off-Highway Products

Service Manual

Axle 725/539
725/540

ASM-0151E
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INTRODUCTION

The efficiency and continued operation of mechanical units depend on constant, correct maintenance and also on efficient repair work, should there be a break-down or malfunction. The instructions contained in this manual have been based on a complete overhaul of the unit. However, it is up to the mechanic to decide whether or not it is necessary to assemble only individual components, when partial repair work is needed. The manual provides a quick and sure guide which, with the use of photographs and diagrams illustrating the various phases of the operations, allows accurate work to be performed.All the information needed for correct disassembly, checks and assembly of each individual component is set out below. In order to remove the differential unit from the vehicle, the manuals provided by the vehicle manufacturer should be consulted. In describing the following operations it is presumed that the unit has already been removed from the vehicle.

IMPORTANT: In order to facilitate work and protect both working surfaces and operators, it is advisable to use proper equipment such as: trestles or supporting benches, plastic or copper hammers, appropriate levers, pullers and specific spanners or wrenches. Before going on to disassemble the parts and drain the oil, it is best to thoroughly clean the unit, removing any encrusted or accumulated grease.

INTRODUCTORY REMARKS: All the disassembled mechanical units should be thoroughly cleaned with appropriate products and restored or replaced if damage, wear, cracking or seizing have occurred. In particular, thoroughly check the condition of all moving parts (bearings, gears, crown wheel and pinion, shafts) and sealing parts (o-rings, oil shields) which are subject to major stress and wear. In any case, it is advisable to replace the seals every time a component is overhauled or repaired. During assembly, the sealing rings must be lubricated on the sealing edge. In the case of the crown wheel and pinion, replacement of one component requires the replacement of the other one. During assembly, the prescribed pre-loading, backlash and torque of parts must be maintained.

CLASSIFICATION: This manual classifies units according to part numbers. For a correct interpretation, classification is indicated as follows:

▶▶ □ = up to the part number

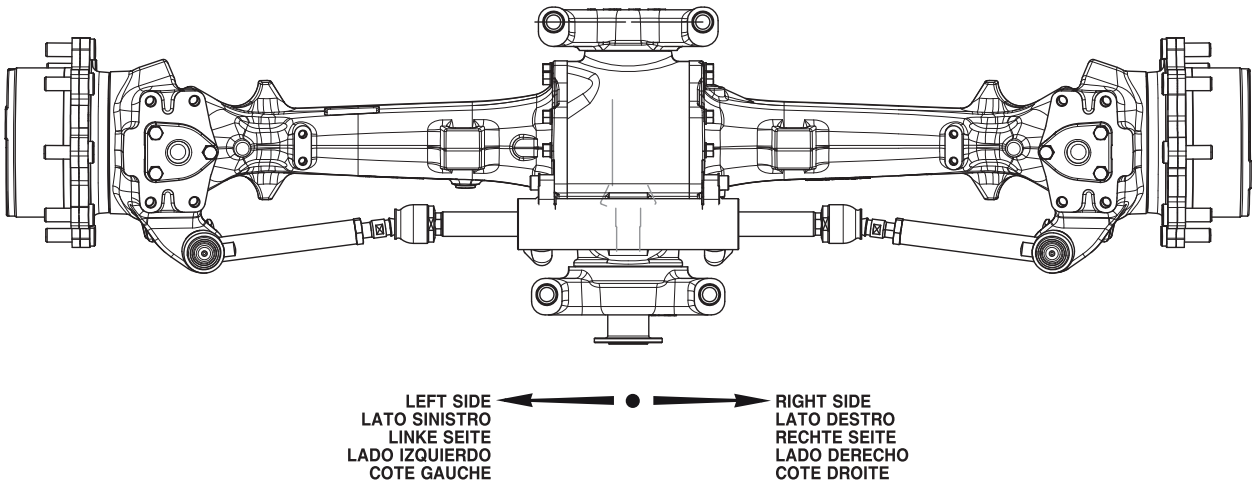
□ ▶▶ = from the part number on

When no classification is given, disassembly and assembly operations are the same for all versions.

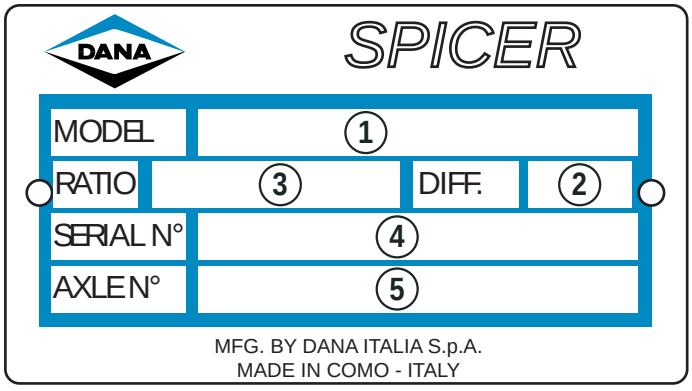
SPECIFIC EQUIPMENT AND SPARE PARTS: The drawings of all specific tools required for maintenance and repair work can be found at the end of this manual; spare parts may be ordered either from the vehicle manufacturer or directly from the Service Centers or Authorized Distributors of SPICER.

SPECIFICATIONS

DEFINITION OF VIEWPOINTS



DATA PLATE



1 - Type and model unit - modification index

2 - Differential type

3 - Reduction ratio

4 - Serial number

5 - Axle number

CONVERSION TABLES

UNITS OF PRESSURE

1 ATM=1 BAR=10^5 PA=14.4 PSI

UNIT OF WEIGHT

	N	daN	kN	kg	lbs
1N	1	0,1	0,001	0,102	0,225
1daN	10	1	0,01	1,02	2,25
1kN	1000	100	1	102	225
1kg	9,81	0,981	0,00981	1	2,205

UNITS OF TORQUE

	N·m	daN·m	kN·m	kg·m	lb·in
1N·m	1	0,1	0,001	0,102	8,854
1daN·m	10	1	0,01	1,02	88,54
1kN·m	1000	100	1	102	8854
1kg·m	9,81	0,981	0,00981	1	86,8
1 lb·in	0,1129	0,01129	0,0001129	0,01152	1

TORQUE SPECIFICATIONS

COARSE PITCH

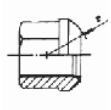
SIZE OF BOLT	TYPE OF BOLT					
	8.8	8.8 + Loctite 270	10.9	10.9 + Loctite 270	12.9	12.9 + Loctite 270
M6 x 1 mm	9,5 – 10,5 N·m	10,5 – 11,5 N·m	14,3 – 15,7 N·m	15,2 – 16,8 N·m	16,2 – 17,8 N·m	18,1 – 20 N·m
M8 x 1,25 mm	23,8 – 26,2 N·m	25,6 – 28,4 N·m	34,2 – 37,8 N·m	36,7 – 40,5 N·m	39 – 43 N·m	43,7 – 48,3 N·m
M10 x 1,5 mm	48 – 53 N·m	52 – 58 N·m	68 – 75 N·m	73 – 81 N·m	80 – 88 N·m	88 – 97 N·m
M12 x 1,75 mm	82 – 91 N·m	90 – 100 N·m	116 – 128 N·m	126 – 139 N·m	139 – 153 N·m	152 – 168 N·m
M14 x 2 mm	129 – 143 N·m	143 – 158 N·m	182 – 202 N·m	200 – 221 N·m	221 – 244 N·m	238 – 263 N·m
M16 x 2 mm	200 – 221 N·m	219 – 242 N·m	283 – 312 N·m	309 – 341 N·m	337 – 373 N·m	371 – 410 N·m
M18 x 2,5 mm	276 – 305 N·m	299 – 331 N·m	390 – 431 N·m	428 – 473 N·m	466 – 515 N·m	509 – 562 N·m
M20 x 2,5 mm	390 – 431 N·m	428 – 473 N·m	553 – 611 N·m	603 – 667 N·m	660 – 730 N·m	722 – 798 N·m
M22 x 2,5 mm	523 – 578 N·m	575 – 635 N·m	746 – 824 N·m	817 – 903 N·m	893 – 987 N·m	974 – 1076 N·m
M24 x 3 mm	675 – 746 N·m	732 – 809 N·m	950 – 1050 N·m	1040 – 1150 N·m	1140 – 1260 N·m	1240 – 1370 N·m
M27 x 3 mm	998 – 1103 N·m	1088 – 1202 N·m	1411 – 1559 N·m	1539 – 1701 N·m	1710 – 1890 N·m	1838 – 2032 N·m
M30 x 3,5 mm	1378 – 1523 N·m	1473 – 1628 N·m	1914 – 2115 N·m	2085 – 2305 N·m	2280 – 2520 N·m	2494 – 2757 N·m

FINE PITCH

SIZE OF BOLT	TYPE OF BOLT					
	8.8	8.8 + Loctite 270	10.9	10.9 + Loctite 270	12.9	12.9 + Loctite 270
M8 x 1 mm	25,7 – 28,3 N·m	27,5 – 30,5 N·m	36,2 – 39,8 N·m	40 – 44 N·m	42,8 – 47,2 N·m	47,5 – 52,5 N·m
M10 x 1,25 mm	49,4 – 54,6 N·m	55,2 – 61 N·m	71,5 – 78,5 N·m	78 – 86 N·m	86 – 94 N·m	93 – 103 N·m
M12 x 1,25 mm	90 – 100 N·m	98 – 109 N·m	128 – 142 N·m	139 – 154 N·m	152 – 168 N·m	166 – 184 N·m
M12 x 1,5 mm	86 – 95 N·m	94 – 104 N·m	120 – 132 N·m	133 – 147 N·m	143 – 158 N·m	159 – 175 N·m
M14 x 1,5 mm	143 – 158 N·m	157 – 173 N·m	200 – 222 N·m	219 – 242 N·m	238 – 263 N·m	261 – 289 N·m
M16 x 1,5 mm	214 – 236 N·m	233 – 257 N·m	302 – 334 N·m	333 – 368 N·m	361 – 399 N·m	394 – 436 N·m
M18 x 1,5 mm	312 – 345 N·m	342 – 378 N·m	442 – 489 N·m	485 – 536 N·m	527 – 583 N·m	580 – 641 N·m
M20 x 1,5 mm	437 – 483 N·m	475 – 525 N·m	613 – 677 N·m	674 – 745 N·m	736 – 814 N·m	808 – 893 N·m
M22 x 1,5 mm	581 – 642 N·m	637 – 704 N·m	822 – 908 N·m	903 – 998 N·m	998 – 1103 N·m	1078 – 1191 N·m
M24 x 2 mm	741 – 819 N·m	808 – 893 N·m	1045 – 1155 N·m	1140 – 1260 N·m	1235 – 1365 N·m	1363 – 1507 N·m
M27 x 2 mm	1083 – 1197 N·m	1178 – 1302 N·m	1520 – 1680 N·m	1672 – 1848 N·m	1834 – 2027 N·m	2000 – 2210 N·m
M30 x 2 mm	1511 – 1670 N·m	1648 – 1822 N·m	2138 – 2363 N·m	2332 – 2577 N·m	2565 – 2835 N·m	2788 – 3082 N·m

WHEEL NUT TIGHTENING TORQUES

Wheel nut tightening torques recommended from rim's O.E.M. with reference to the quality of the rim's material.

WHEEL NUT TIGHTENING TORQUES				
CHARACTERISTICS	ILLUSTRATION	WHEEL STUD THREAD	RECOMMENDED WHEEL NUTS TORQUE	
			RIM MATERIAL QUALITY	
			ST 37	**ST 52
WHEEL NUTS WITH INTEGRATE SPHERICAL COLLAR		M18 x 1,5 mm	330 N·m	460 N·m
		M20 x 1,5 mm	490 N·m	630 N·m
		M22 x 1,5 mm	630 N·m	740 N·m
FLAT COLLAR WHEEL NUTS WITH SEPARATE SPHERICAL LOCK WASHER		M18 x 1,5 mm	270 N·m	360 N·m
		M20 x 1,5 mm	360 N·m	450 N·m
		M22 x 1,5 mm	460 N·m	550 N·m
WHEEL NUTS WITH INTEGRATE SEAT CAPTIVE WASHER		M18 x 1,5 mm	260 N·m	360 N·m
		M20 x 1,5 mm	350 N·m	500 N·m
		M22 x 1,5 mm	450 N·m	650 N·m

****RIM MATERIAL ST 52 IS RECOMMENDED BY DANA ON AXLE APPLICATIONS. IT IS THE OPTIMUM MATERIAL FOR TIGHTENING THE RIM TO THE HUB.**

NOTE:

The wheel nut tightening torque is related only on nut thread and stud thread dry (without oil or any lubricant).

NOTE:

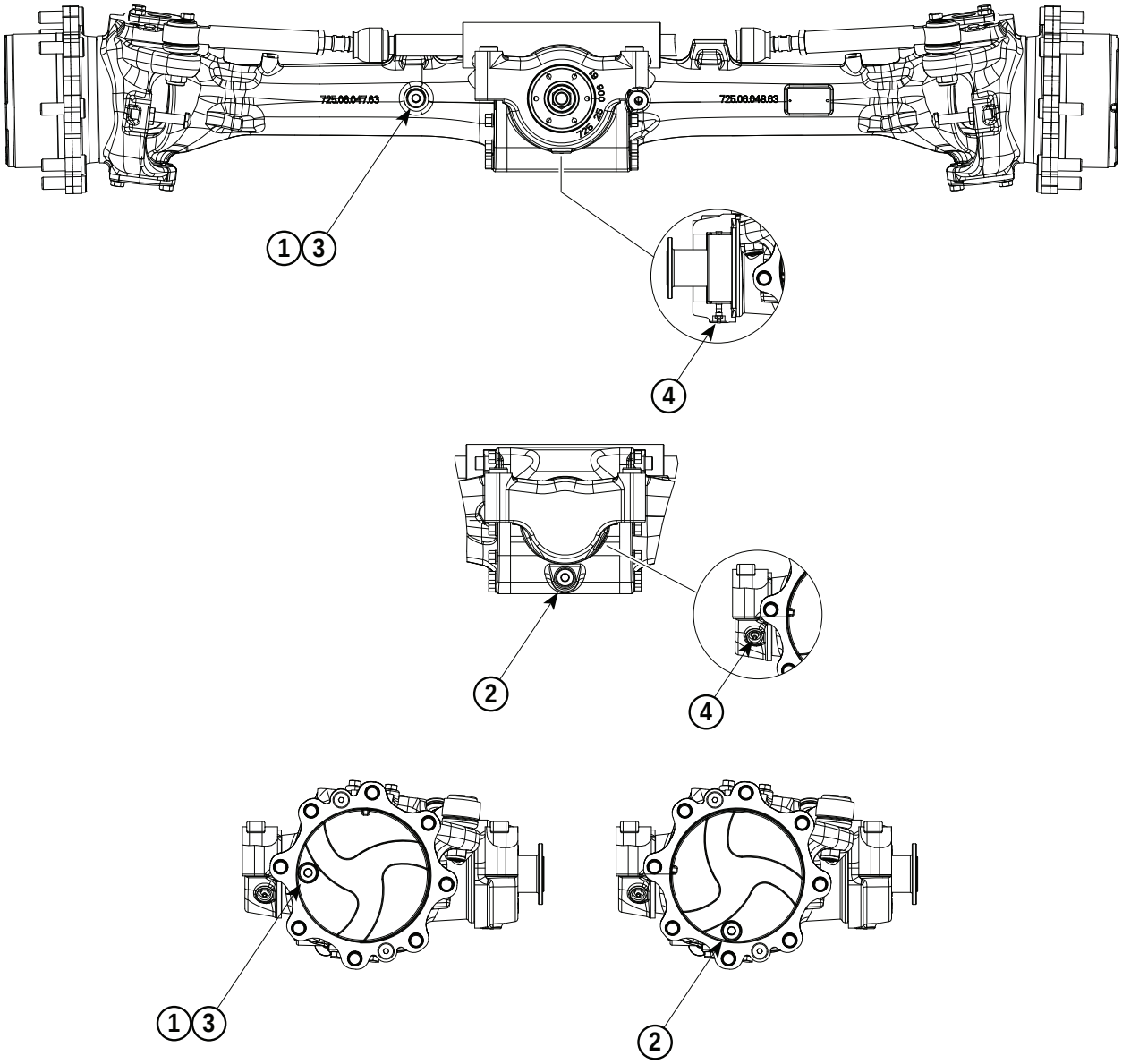
The wheel nut tightening torque takes into consideration not only the nut + stud characteristics, but also the quality of the rim material.

THE DANA OFFICIAL TIGHTENING TORQUE TABLE, THAT IS INCLUDED IN EACH SERVICE MANUAL, SHOWS THE TORQUE FIGURE RELATED TO THE BOLT CHARACTERISTIC ONLY.		
DANA OFFICIAL TIGHTENING TORQUE TABLE		
NUT MATERIAL QUALITY 8.8 & 10.9	STUD MATERIAL QUALITY 10.9	*ALLOW TIGHT TORQUE
M18 x 1,5 mm	M18 x 1,5 N·m	442 ÷ 489 N·m
M20 x 1,5 mm	M20 x 1,5 N·m	613 ÷ 677 N·m
M22 x 1,5 mm	M22 x 1,5 N·m	822 ÷ 908 N·m

***THE TORQUE FIGURE ON NUT AND STUD COUPLING MUST BE RELATED ON STUD MATERIAL QUALITY (DANA AXLES ARE 10.9 ONLY).**

MAINTENANCE

MAINTENANCE POINTS



1 - Oil filling plug
2 - Oil draining plug
3 - Check level plug
4 - Grease zerk

MAINTENANCE INTERVALS

OPERATION		FREQUENCY	LUBRICANTS
Check levels	Differential	Monthly	SAE85W90 (API GL4 - MIL L-2105) With additives for oil-bath brakes
	Planetary reduction	Every 200 hours	
Oil change	Differential	Every 1000/1200 hrs *	
	Planetary reduction	Every 1000/1200 hrs *	

It is recommended to set the axle's oil changes according to the machine maintenance intervals.
If working in heavy conditions half intervals should be used.
* Initially after 100 working hours

OPERATION	MEMBER	CONDITIONS	FREQUENCY	LUBRICANTS
Greasing	Articulations	Normal work	Monthly	MOLIKOTE
		Severe duty	Weekly	

ADJUSTMENT AND CHECKS

UNIT	OPERATION	FREQUENCY	SERVICE BRAKE CIRCUIT
Wheel nuts	Tightening	Every 200 hours**	Only for mineral oil use e.g. ATF Dexron II. Make sure that master cylinder seals are suitable for mineral oil.

** Initially after 10 working hours

LUBRICANT & SEALANT SPECIFICATIONS

1 - Locking, sealing and lubricating materials referred to in this manual are the same used in the shop-floor.

2 - The table below gives an account of the typical applications of each single material, in order to facilitate replacement with similar products marketed by different brand names with different trade marks.

LOCTITE 242

Anaerobic product apt to prevent the loosening of screws, nuts and plugs. Used for medium-strength locking. Before using it, completely remove any lubricant by using the specific activator.

LOCTITE 243

The oleocompatible alternative to 242. Does not require the activation of lubricated surfaces.

LOCTITE 270

Anaerobic product for very-high strength locking of screws and nuts. Before using it, completely remove any lubricant by using the specific activator.

To remove parts, it may be necessary to heat them at 80 °C approximately.

LOCTITE 275

Anaerobic product suitable for high-strength locking and sealing of large threaded parts, bolts and stud bolts, for pipe sealing and for protecting parts against tampering; suitable for sealing coupling surfaces with a maximum diametrical clearance of 0.25 mm.

LOCTITE 510

Anaerobic product for the hermetic sealing of flanged units and screw holes communicating with fluids. Can seal clearances between flanges up to 0.2 mm.

LOCTITE 577

Quick anaerobic sealant for sealing threaded portions of conical or cylindrical unions up to M80. Before using it, remove any lubricant with the specific activator. After polymerisation, disassembly may result rather difficult, so heating may be necessary for larger diameters.

LOCTITE 638

Anaerobic adhesive for fast and high-strength gluing of cylindrical metal joints (hub on shaft). Can glue together parts with clearance ranging between 0.1 and 0.25 mm.

LOCTITE 648

Anaerobic adhesive for fast and medium-strength gluing of cylindrical metal joints (hub on shaft). Can glue together parts with radial clearance below 0.1 mm.

AREXONS (REPOSITIONABLE JOINTING COMPOUND FOR SEALS)

Solvent-based sealing compound for elastic seals, drying through evaporation. Used for sealing the outer diameter of sealing rings for rotating shafts with outer metal reinforcement.

SILICONE

Semi-fluid adhesive material used for sealing and filling and to protect components from environmental and physical elements. Polymerises with non-corrosive dampness.

TECNO LUBE/101 (SILICONE-BASED GREASE)

Highly adhesive synthetic grease, with silicone compounds added.

Applied to adjustment screws with hole communicating with oil-type fluids.

Used when frequent adjusting is required.

MOLIKOTE (DOW CORNING)

Lubricating compound containing molybdenum disulphide, used to lubricate articulation pins and to prevent sticking and oxidation of parts that are not lubricated on a regular basis.

(LITHIUM-BASED) GREASE

Applied to bearings, sliding parts and used to lubricate seals or parts during assembly.

SAFETY PRECAUTIONS

1 - During all operations described in this manual, the axle should be fastened onto a trestle, while the other parts mentioned should rest on supporting benches.

2 - When removing one of the arms, an anti-tilting safety trestle should be placed under the other arm.

3 - When working on an arm that is fitted on the machine, make sure that the supporting trestles are correctly positioned and that the machine is locked lengthways.

4 - Do not admit any other person inside the work area; mark off the area, hang warning signs and remove the ignition key from the machine.

5 - Use only clean, quality tools; discard all worn, damaged, lowquality or improvised wrenches and tools. Ensure that all torque wrenches have been checked and calibrated.

6 - Always wear gloves and non-slip rubber shoes when performing repair work.

7 - Should you stain a surface with oil, remove marks straight away.

8 - Dispose of all lubricants, seals, rags and solvents once work has been completed. Treat them as special waste and dispose of them according to the relative law provisions obtaining in the country where the axles are being overhauled.

9 - Make sure that only weak solvents are used for cleaning purposes; avoid using turpentine, dilutants and toluol, xylolbased or similar solvents; use light solvents such as Kerosene, mineral spirits or water-based, environment friendly solvents.

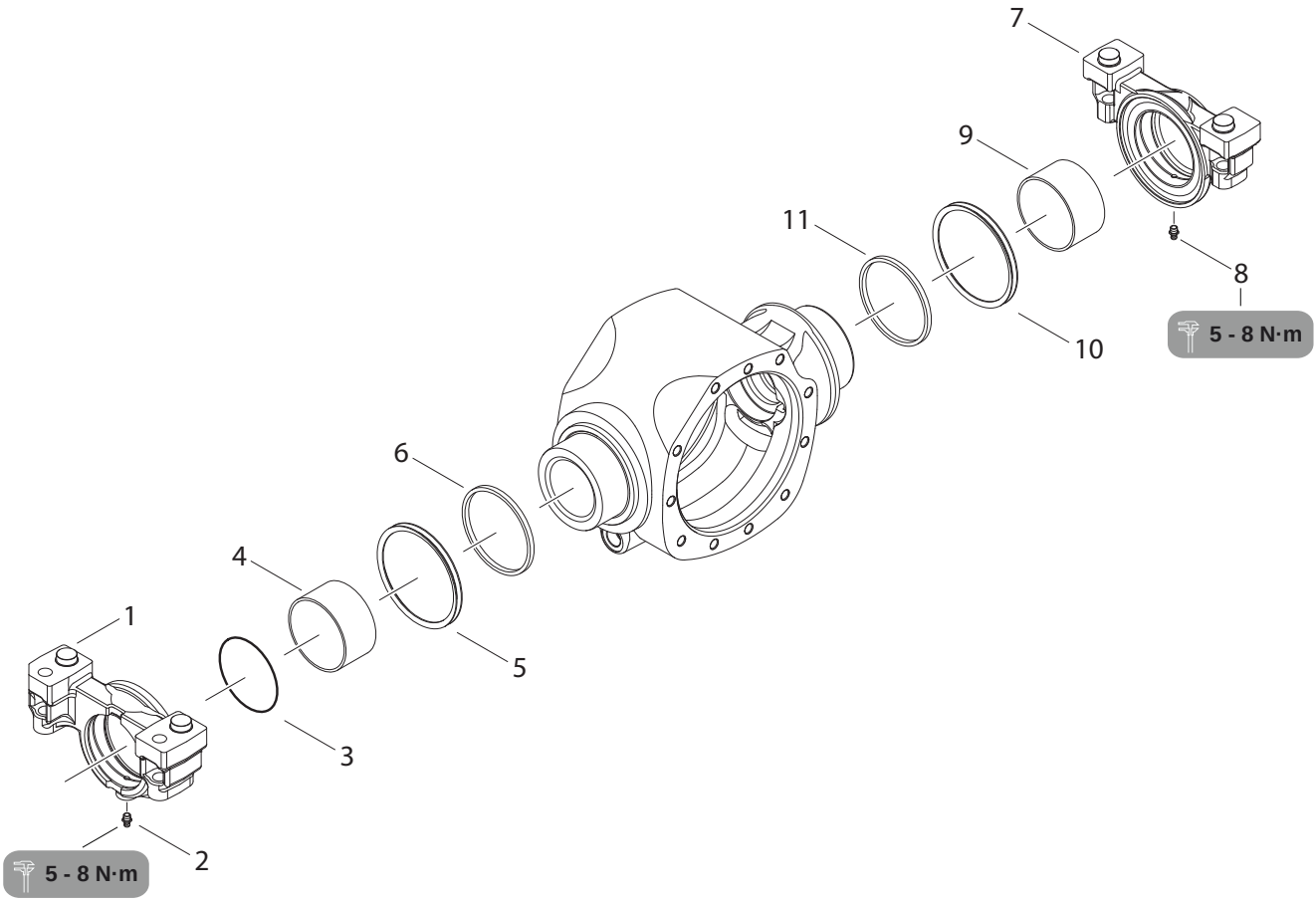
10 - For the sake of clarity, the parts that do not normally need to be removed have not been reproduced in some of the diagrams.

11 - After repair work has been completed, accurately touch up any coated part that may have been damaged.

12 - Follow all safety instructions in the Original Equipment Manufacturer (OEM) manual that came with the vehicle.

SWINGING SUPPORT

EXPLODED VIEW



DISASSEMBLY

FIGURE 1: Remove the swinging support (1) on the drive side.

FIGURE 2: Remove the shim washer (6) and the v-ring (5)

FIGURE 3: Use a screwdriver to remove the o-ring (3).

FIGURE 4: Only if necessary, remove the grease zerk (2).

FIGURE 5: Using an extractor, remove the bushing (4) from the swinging support (1).

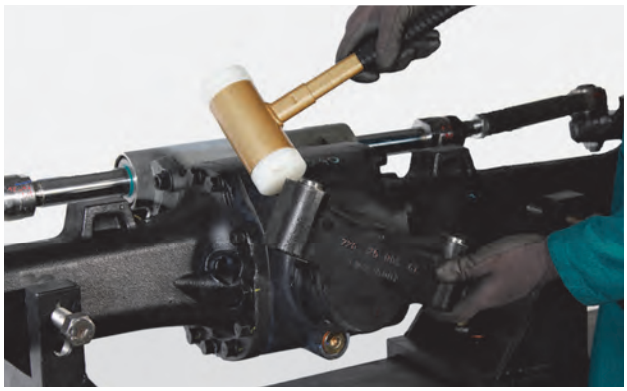


FIGURE 6: Remove the swinging support (7) on the side opposite the drive.

FIGURE 7: Remove the shim washer (11) and the v-ring (10).

FIGURE 8: Only if necessary, remove the grease zerk (8).

FIGURE 9: Using an extractor, remove the bushing (9) from the swinging support (7).

ASSEMBLY

FIGURE 10: Using tool T1 (See drawing T1 p. 73), mount the bushing (4) in the swinging support (1) on the pinion side.

FIGURE 11: The o-ring (3) housing should be mounted externally.

NOTE:

The hole for the grease zerk on the bushing (4) is oriented towards grease zerk hole.

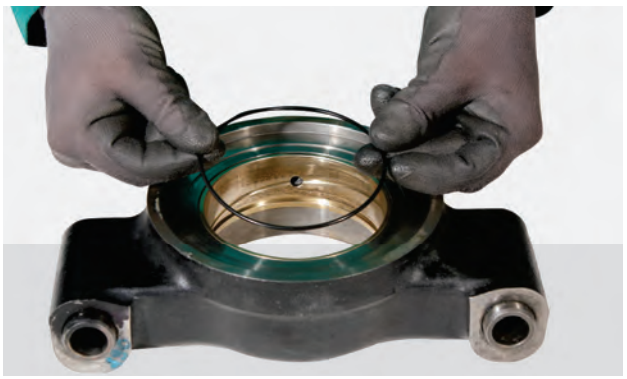


FIGURE 12: Lubricate the o-ring (3) to hold in position and install it in the bushing.

FIGURE 13: Install the grease zerk (2) and tighten to a torque wrench setting of 5 - 8 N·m.

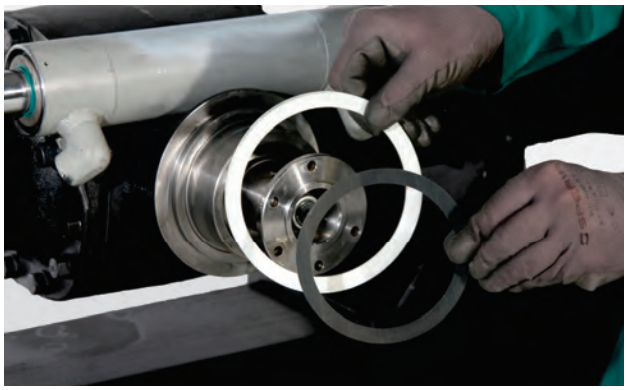


FIGURE 14: Install the v-ring (5) and the shim washer (6).

NOTE:

Lubricate with grease before installing.

FIGURE 15: Install the swinging support (1).

NOTE:

Check that it is properly oriented.

Using a grease gun, lubricate the swinging support housing.

FIGURE 16: Make sure hole for the grease zerk on the bushing (9) should be oriented towards grease zerk hole.

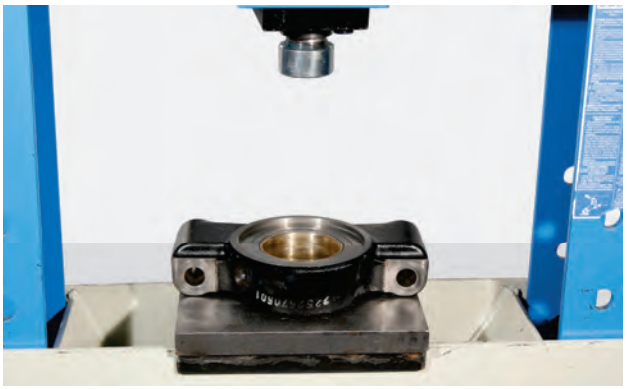


FIGURE 17: Using tool T1 (See drawing T1 p. 73), mount the bushing (9) in the swinging support (7) on the pinion's opposite side.

FIGURE 18: Install the v-ring (10) and the shim washer (11).

NOTE:

Lubricate with grease before installing.

FIGURE 19: Install the grase zerk (8) and tighten to a torque wrench setting of 5 - 8 N·m.

FIGURE 20: Install the swinging support (7).

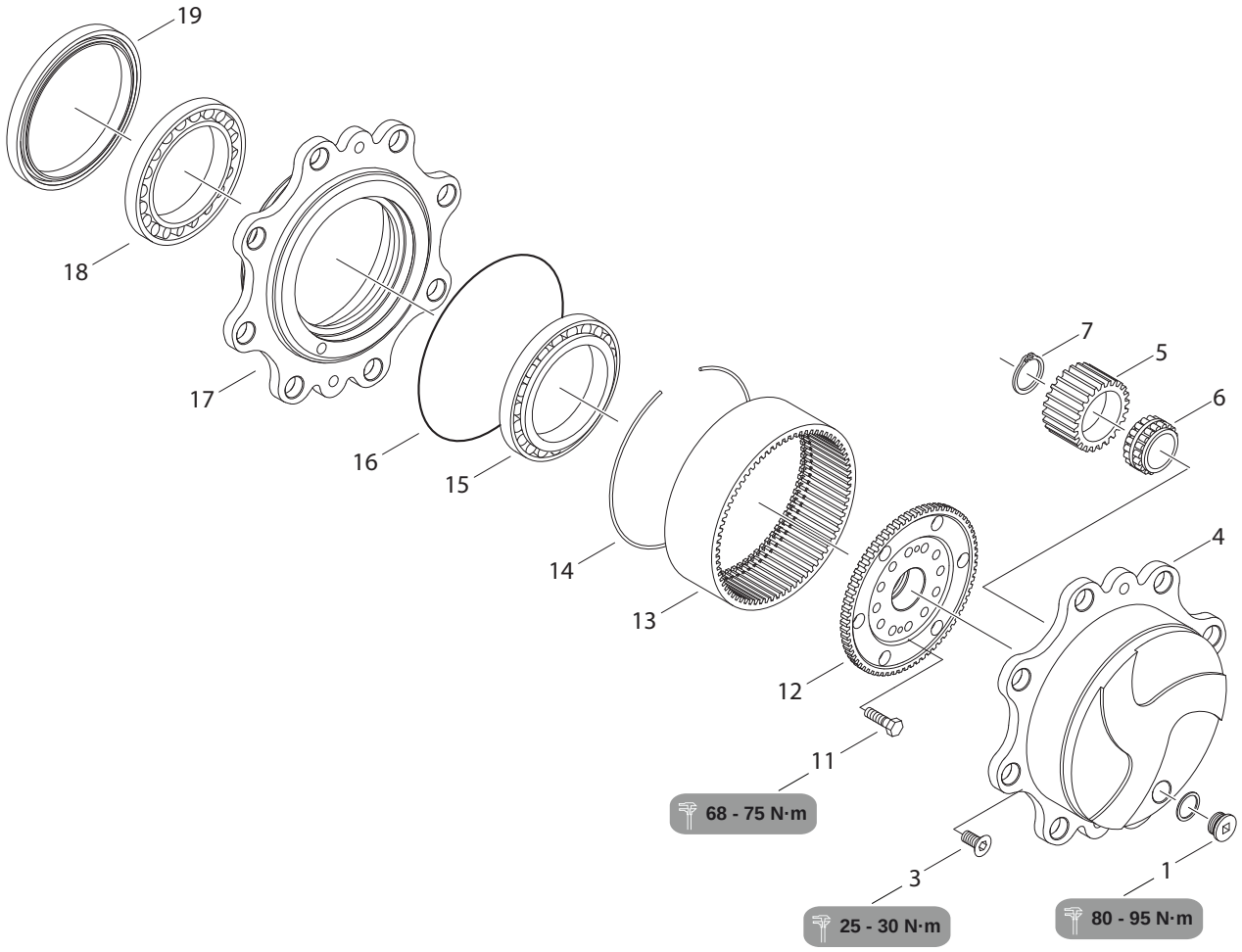
NOTE:

Check that it is properly oriented.

Using a grease gun, lubricate the swinging support housing.

PLANETARY REDUCTION GEAR

EXPLODED VIEW



DISASSEMBLY

⚠CAUTION

Perform all operations on both arms.

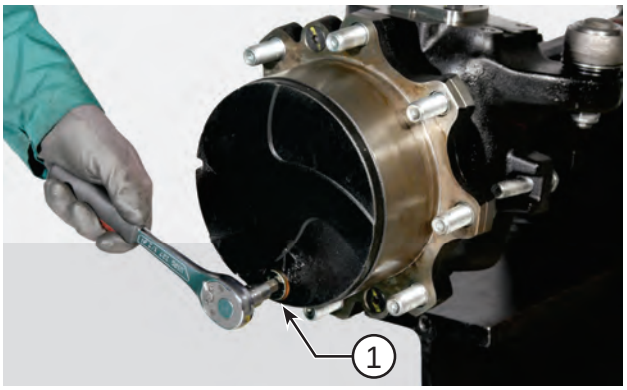


FIGURE 1: Remove the oil-level plug (1) and drain oil.

⚠CAUTION

Make sure all fluids are contained during inspection, maintenance, tests, adjustment and repair of the product. Prepare a suitable container to collect the fluid before removing any component containing fluids. Dispose of all fluids following legal and local regulations.

⚠WARNING

Hot oil and components can cause personal injury. Avoid skin contact.

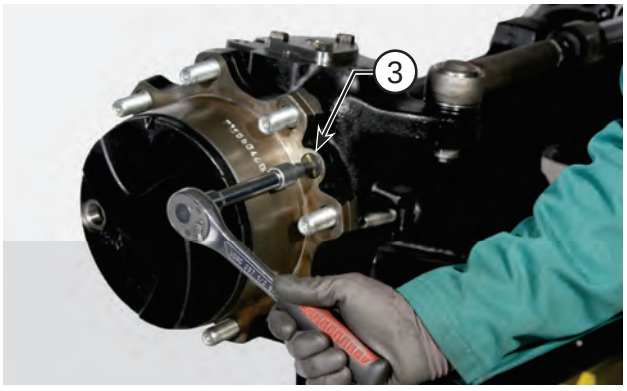


FIGURE 2: Remove the locking screws (3) of planetary cover (4).

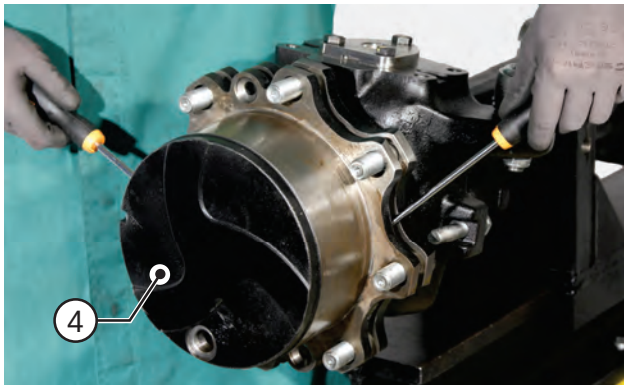


FIGURE 3: Disjoin the spider cover (4) from the hub by alternatively forcing a screwdriver into the appropriate slots.

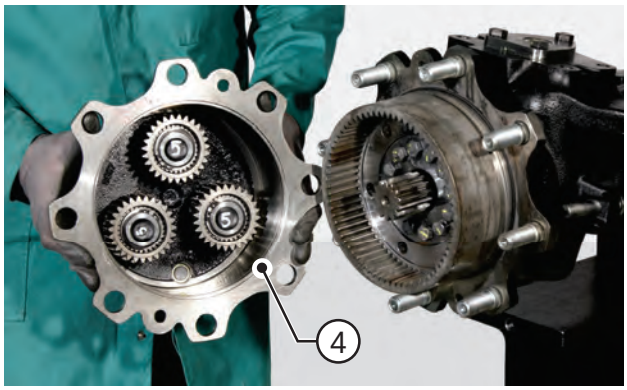


FIGURE 4: Remove the complete planetary carrier cover (4).

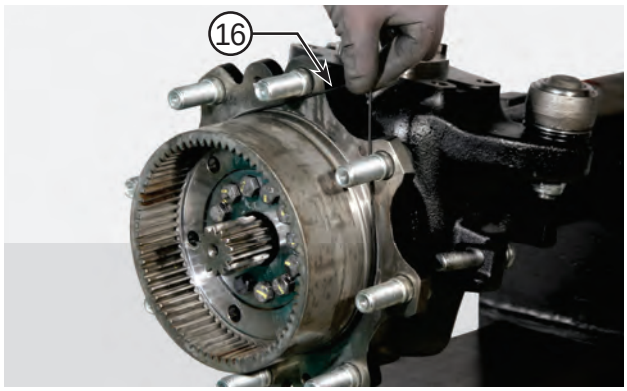


FIGURE 5: Use a screwdriver to remove the o-ring (16).

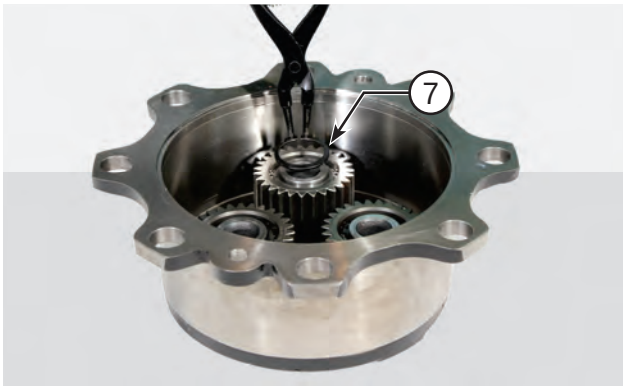


FIGURE 6: Remove snap ring (7).

⚠WARNING

Removal of the snap rings can cause personal injuries. You must wear appropriate safety equipment. To avoid injury to eyes, wear eye protection equipment.

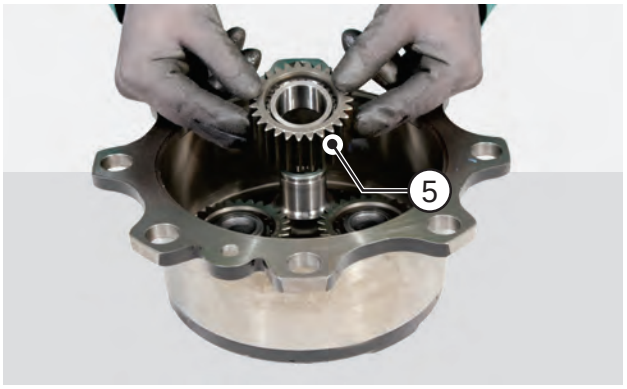


FIGURE 7: Remove the planetary gears (5) and the bearings (6).

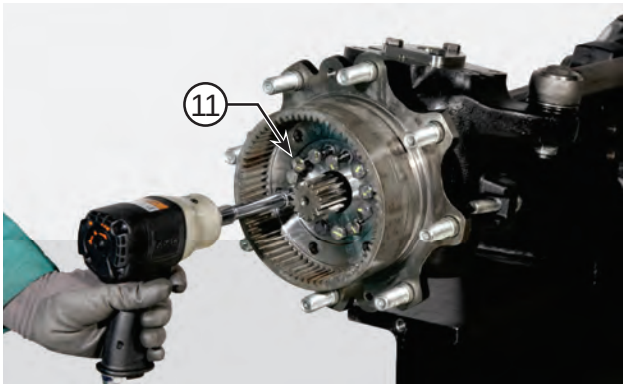


FIGURE 8: Loosen and remove the screws (11) from the crown flange (12).

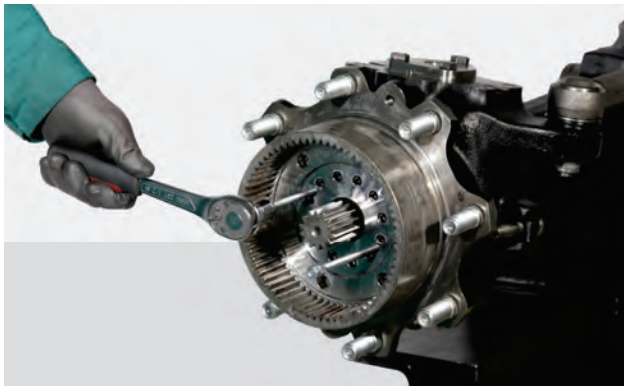


FIGURE 9: Tighten two M8 screws in the special threads. Tighten by one turn alternately.

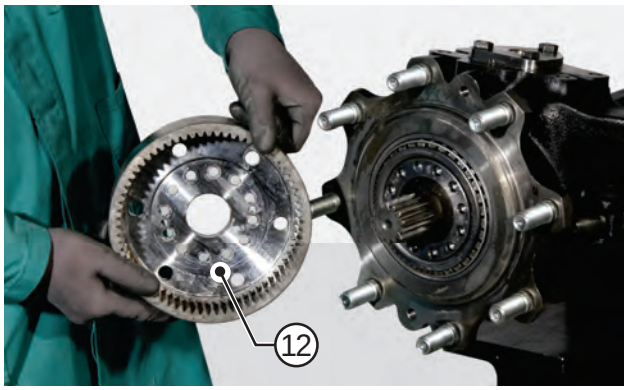


FIGURE 10: Remove the crown (13).

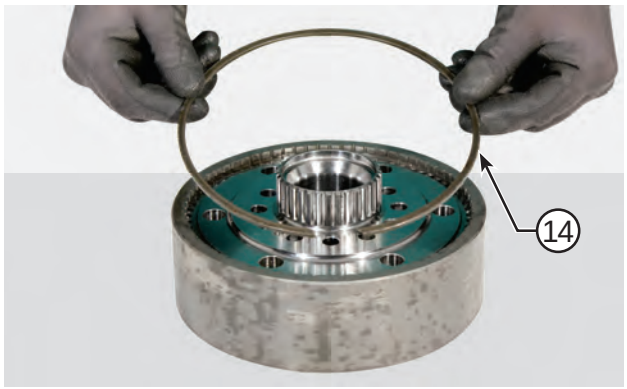


FIGURE 11: Remove the snap ring (14) from the crown (13).

⚠WARNING

Removal of the snap rings can cause personal injuries. You must wear appropriate safety equipment. To avoid injury to eyes, wear eye protection equipment.

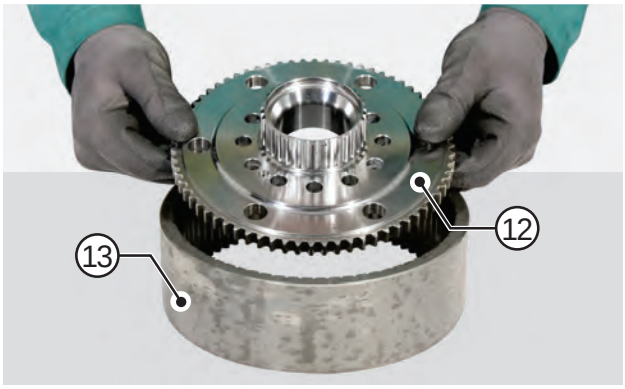


FIGURE 12: Remove the crown flange (12).

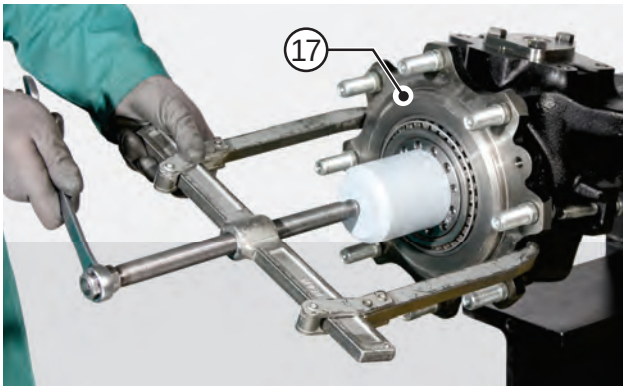


FIGURE 13: Harness the wheel hub (17) and partially extract using an extractor.

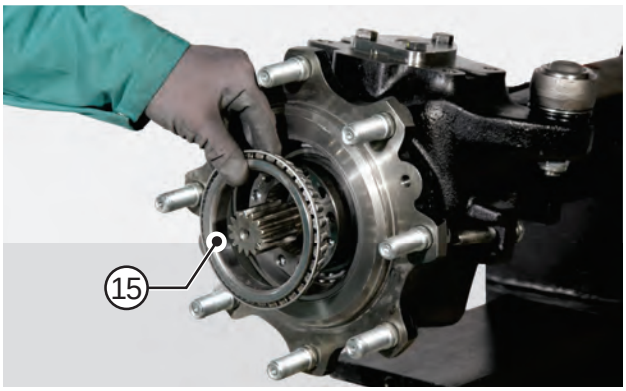


FIGURE 14: Remove the external bearing (15) and the hub (17).

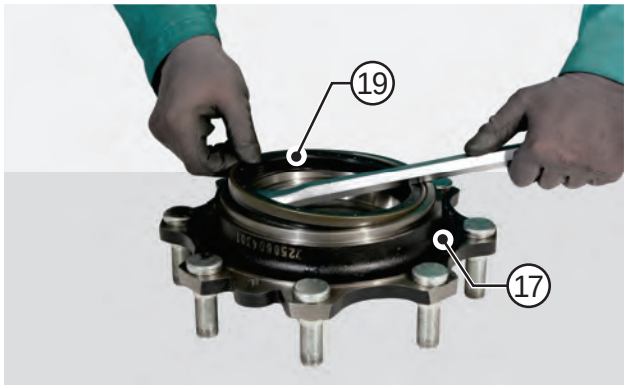


FIGURE 15: Remove the sealing ring (19) from the hub (17).

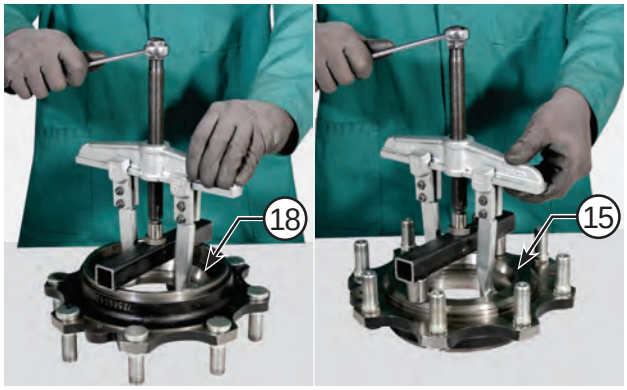


FIGURE 16: Remove the thrust blocks (15, 18) from the bearings and force a puller into the appropriate slots on the hub.

NOTE:

Avoid clamping or deformation of the thrust blocks.

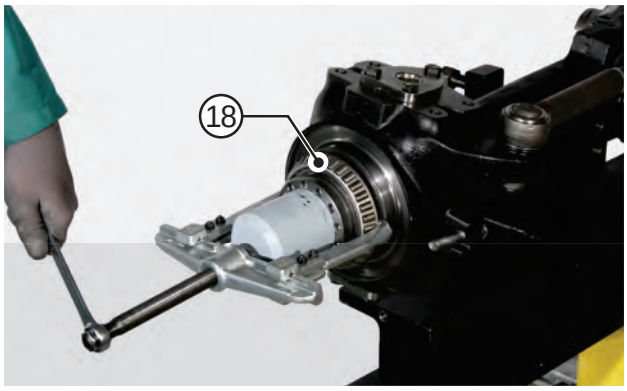


FIGURE 17: Remove the internal bearing (18).

ASSEMBLY

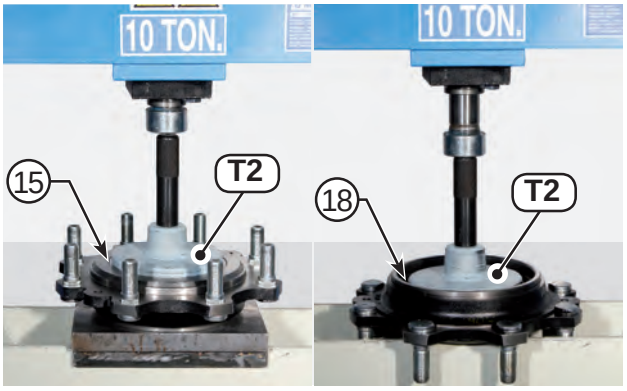


FIGURE 18: Position the tool T2 (See drawing T2 p. 73) and press the thrust blocks (15, 18) into the hub (17) all the way down.

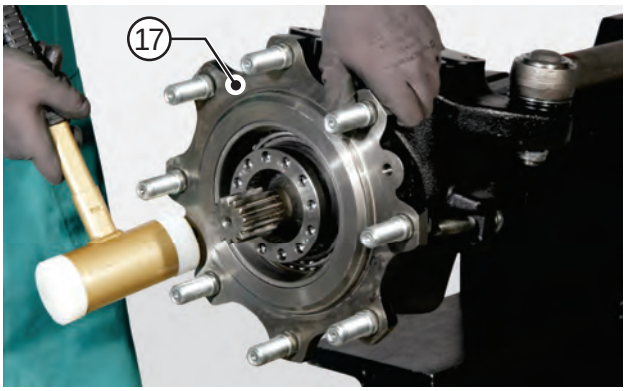


FIGURE 19: Install the wheel hub (17) on the steering knuckle.

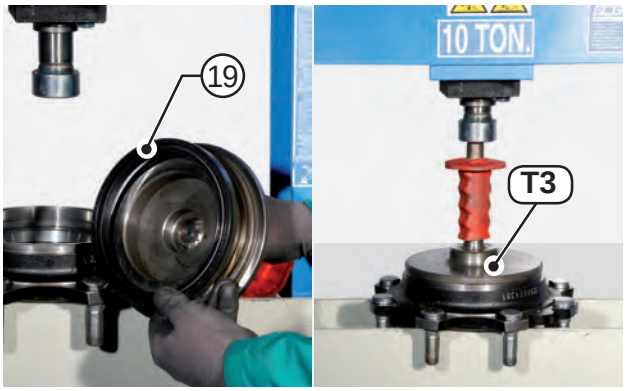


FIGURE 20: Position the sealing ring (19) in the special tool T3 (See drawing T3 p. 73) and press into its seat.

NOTE:

Check that the ring (19) is correctly oriented. Flat surface should be visible after mounting.

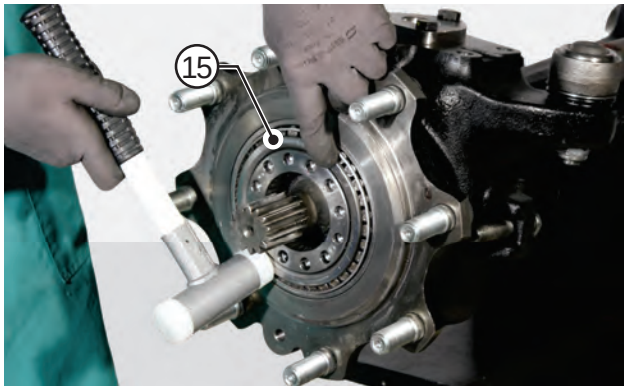


FIGURE 21: Install the external bearing (15).

NOTE:

Using a plastic hammer, drive the bearing to the limit stop by lightly hammering around the edge.

FIGURE 22: Install the crown wheel (13).

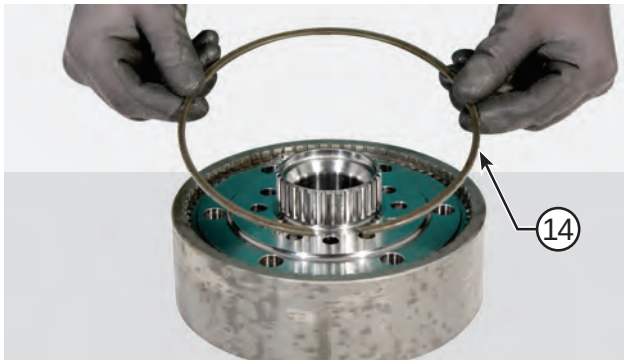


FIGURE 23: Insert the snap ring (14) in order to fix the flange (12) in the crown (13).

⚠WARNING

Personal injury can result when installing snap ring.

The appropriate safety equipment must be worn.

To avoid injury to your eyes, wear protective glasses during this procedure.

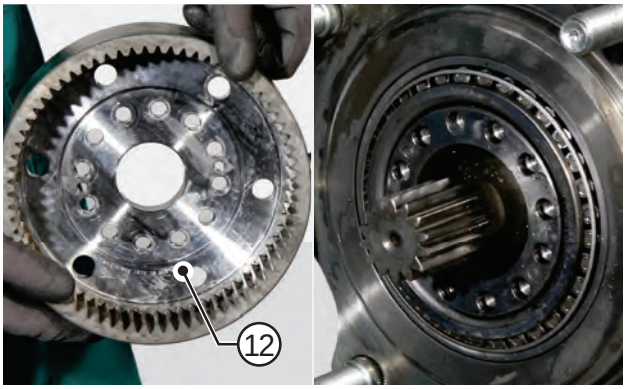


FIGURE 24: Match up the punch marks on the joint case and the crown wheel carrier flange.

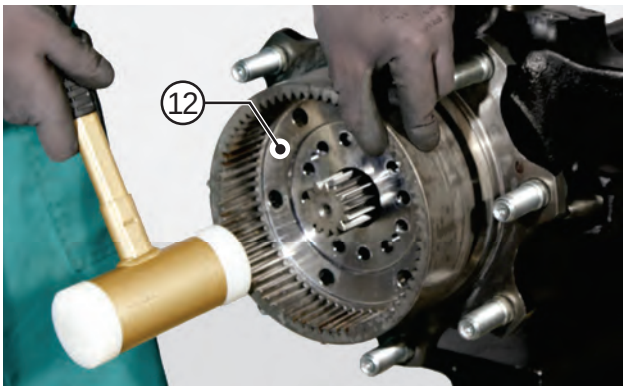


FIGURE 25: Install the complete crown flange (12) using a plastic hammer and alternately hammering on several equidistant points.

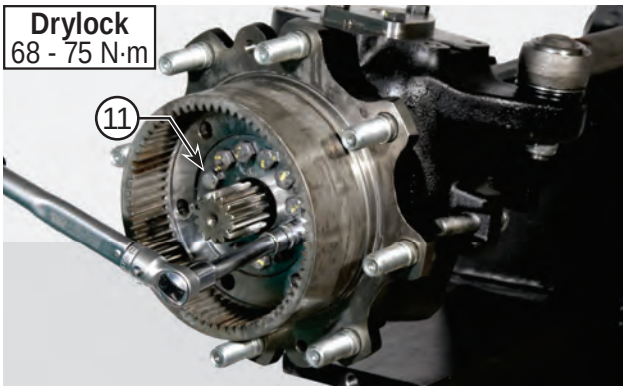


FIGURE 26: Tighten the screws (11) in two stages, using the criss-cross method.
Final torque wrench setting: 68 - 75 N·m

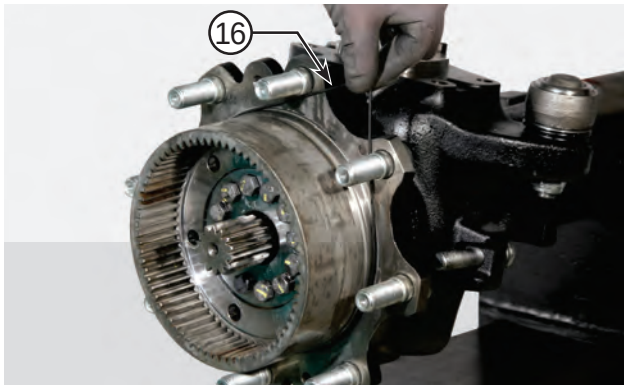


FIGURE 27: Insert a new o-ring (16) on the centering diameter of wheel hub.

NOTE:

In order to hold the o-ring (16) in position, apply grease to it.

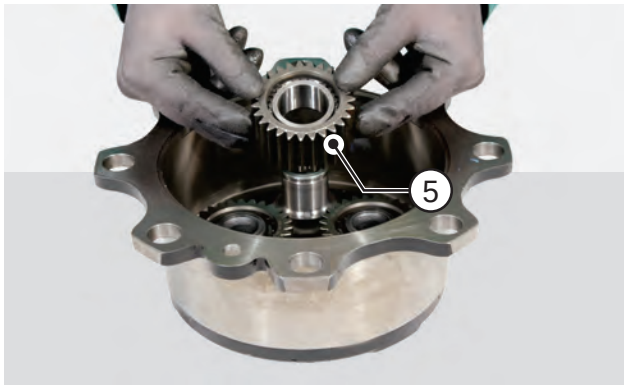


FIGURE 28: Install the planetary gear (5) into the planetary gear cover (4), using a drift.

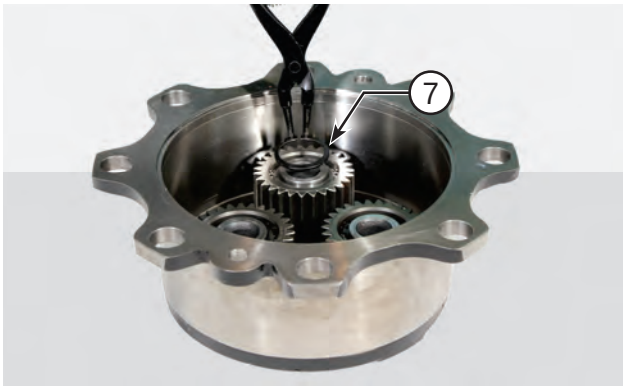


FIGURE 29: Lock into position the planetary gears (5) with the snap rings (7).

⚠WARNING

Personal injury can result when installing snap ring.

The appropriate safety equipment must be worn.

To avoid injury to your eyes, wear protective glasses during this procedure.

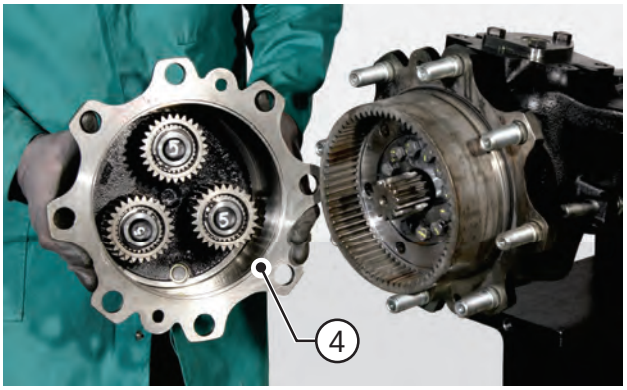


FIGURE 30: Fit the planetary carrier cover (4) onto the hub (17).

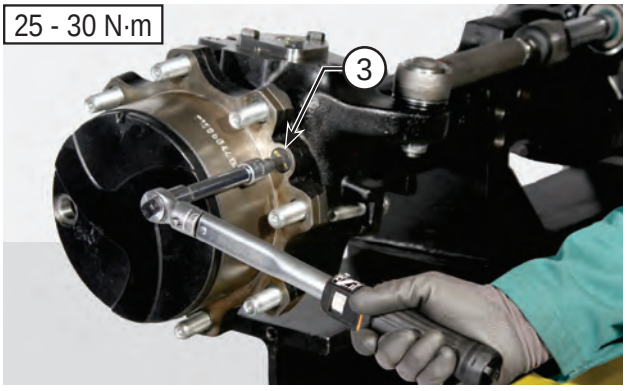


FIGURE 31: Lock the planetary carrier cover (4) by tightening the screws (3).
Torque wrench setting for screws: 25 - 30 N·m.

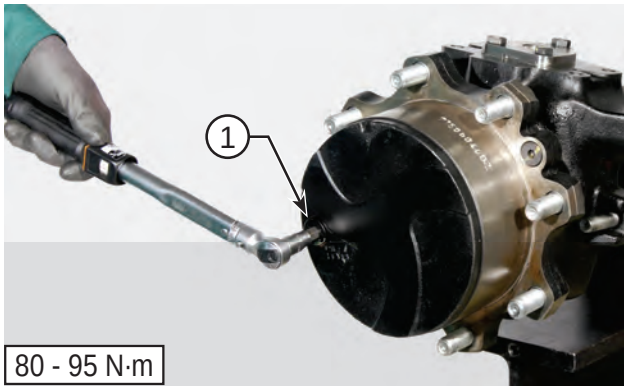
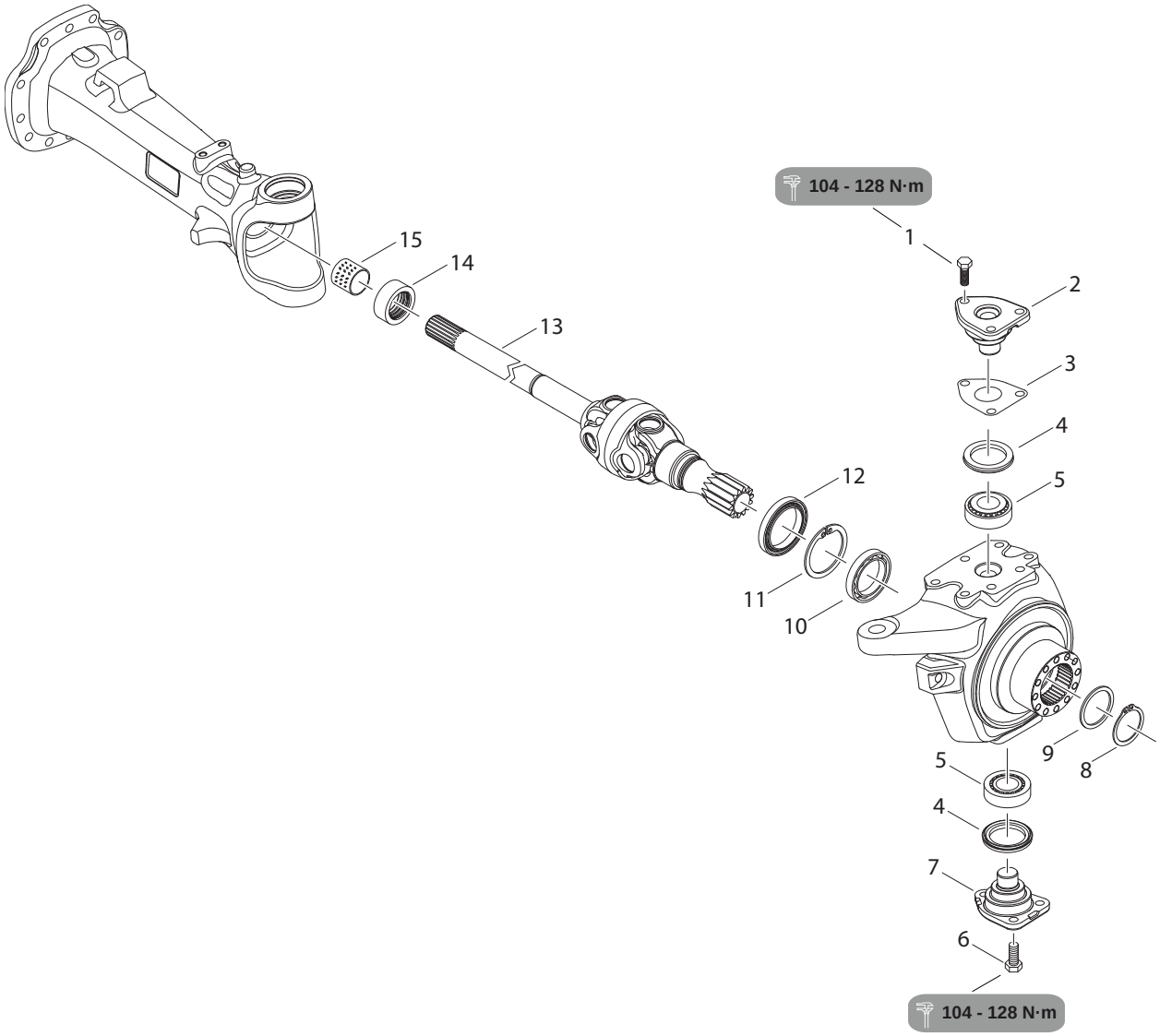


FIGURE 32: Install the oil level plug (1).
Torque wrench setting for screws: 80 - 95 N·m.

STEERING KNUCKLE

EXPLODED VIEW



DISASSEMBLY

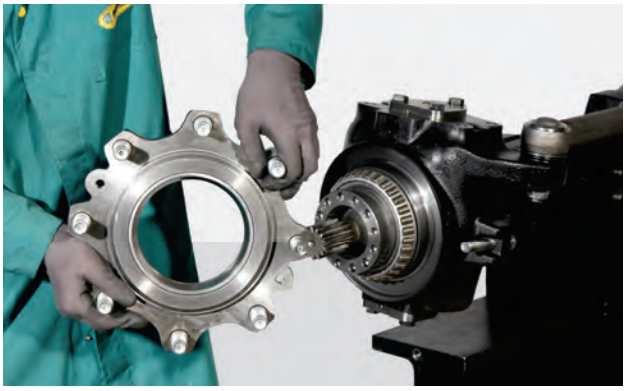


FIGURE 1: Remove the complete crown flange.
For details, see PLANETARY REDUCTION GEAR p. 21.

FIGURE 2: Remove the nuts that lock the articulation pins.

FIGURE 3: Disconnect the tapered pins of the articulation from the steering knuckle using a puller.

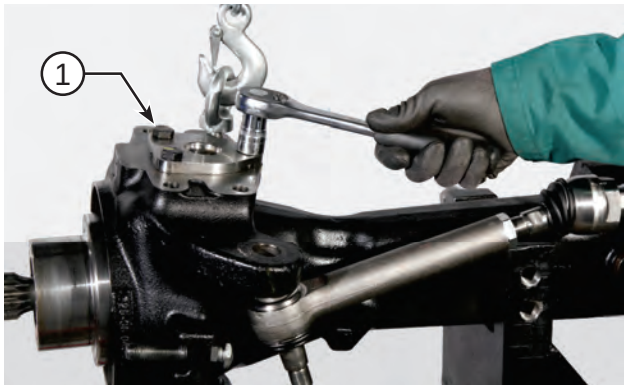


FIGURE 4: Loosen and remove the capscrews (1) from the king pin (2).

NOTE:

Screws cannot be re-used.

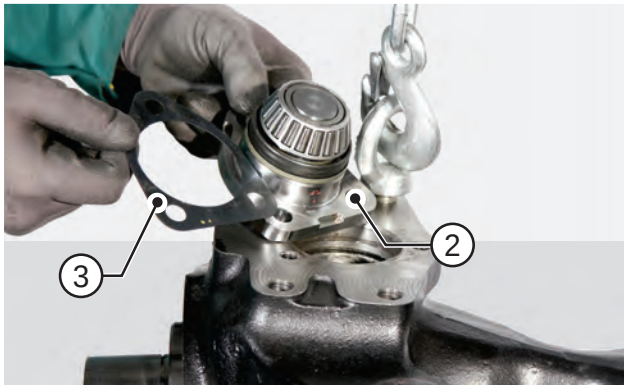


FIGURE 5: Remove the upper king pin (2) complete with front seal ring (4) and shims (3).

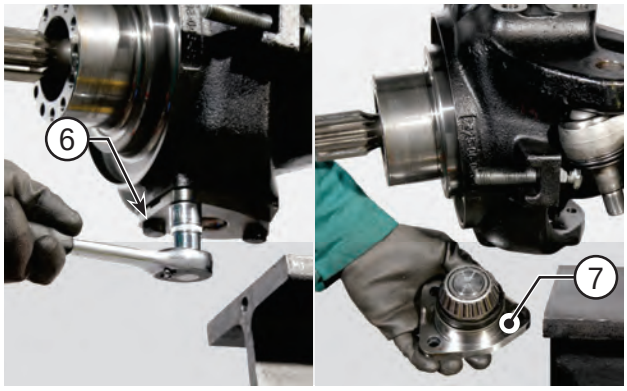


FIGURE 6: Loosen and remove the capscrews (6) and remove the bottom king pin (7).

NOTE:

Screws cannot be re-used.

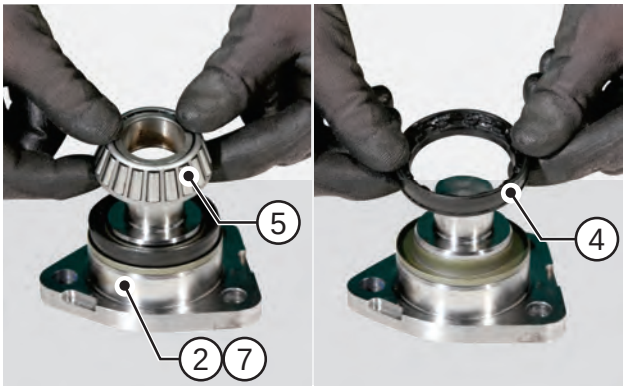


FIGURE 7: Remove the bearing (5) from the king pin (2, 7). Remove the sealing ring (4) from the king pin (2, 7).

FIGURE 8: Remove the complete steering knuckle.

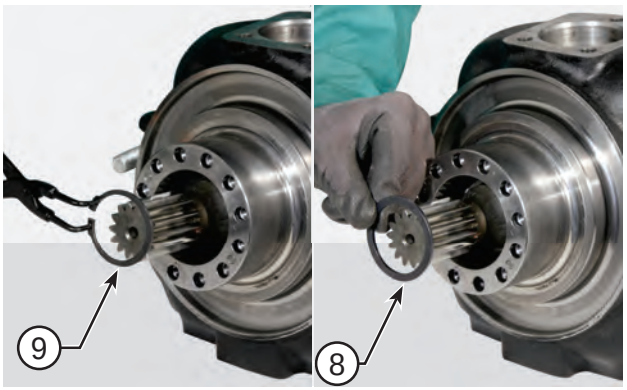


FIGURE 9: Remove snap ring (8) and the shim (9) from the steering knuckle.

FIGURE 10: Remove the u-joint (13).

FIGURE 11: Using a puller, remove the sealing ring (12) from the steering knuckle.

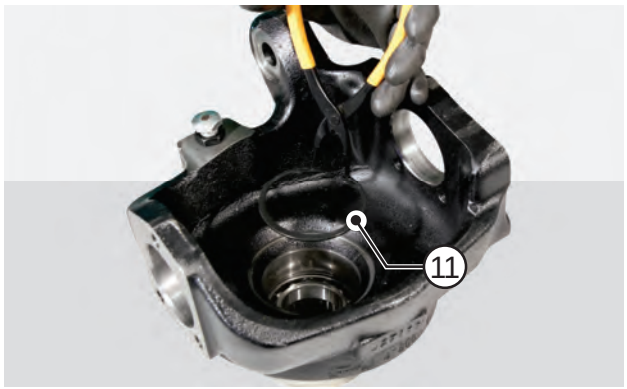


FIGURE 12: Remove the snap ring (11) from the steering knuckle.

FIGURE 13: Using a puller, remove the bearing (10) from the steering knuckle.

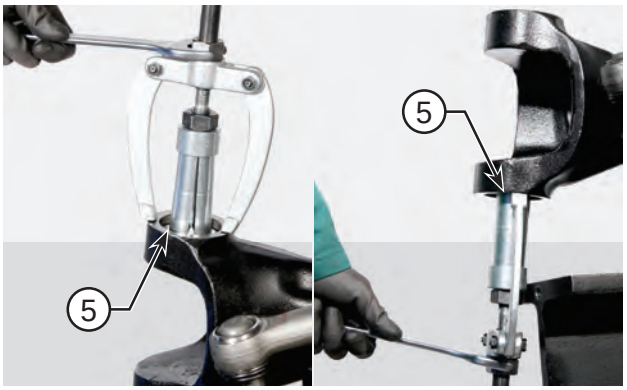


FIGURE 14: Using an extractor for inner parts, remove the top and bottom thrust blocks (5).

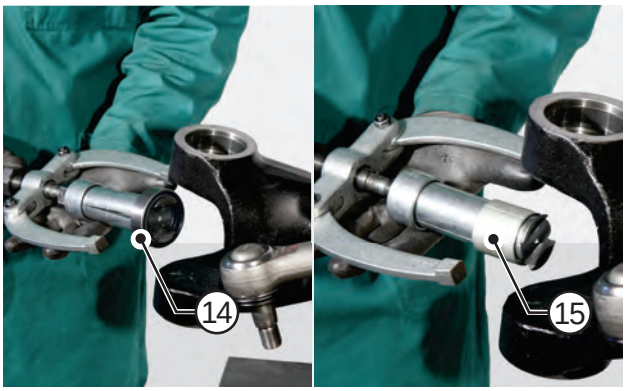


FIGURE 15: Using an extractor for inner parts, remove the seal ring (14) and subsequently the bushing (15).

NOTE:

Write down the direction of assembly of seal ring.
Write down the assembly side of the connection notch.

ASSEMBLY

FIGURE 16: Lubricate the bushing (15) and the seat and install the bushing (15), using tool T4 (See drawing T4 p. 74).

FIGURE 17: Lubricate and fit the sealing ring (14) onto tool T5 (See drawing T5 p. 75); install the rings into the arm.

⚠CAUTION

Pay particular attention to the direction of assembly of the rings.

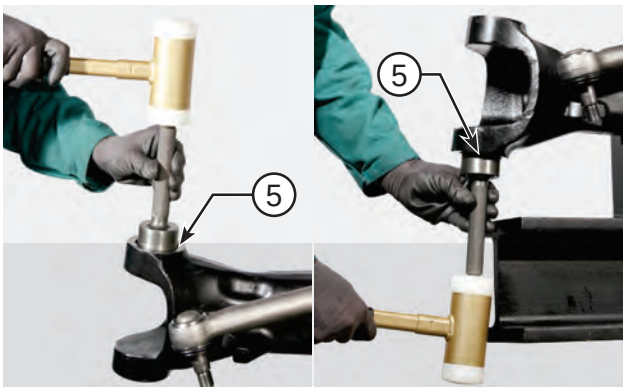


FIGURE 18: Lubricate the top and bottom thrust blocks (5) and fit them into the fulcrum holes of the arm.

NOTE:

Verify at end of stroke.

FIGURE 19: Insert the bearing (10) in the steering knuckle.

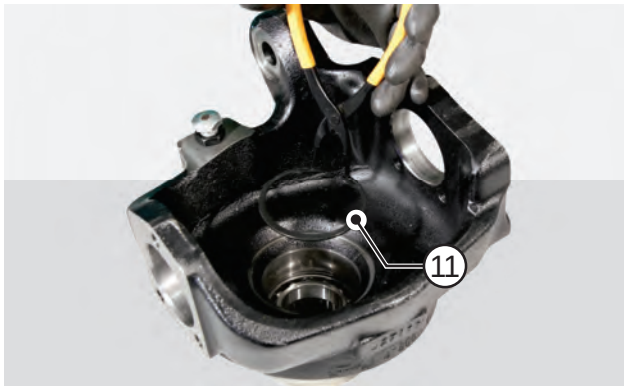


FIGURE 20: Install the bearing (10) snap ring (11) and carefully check it is completely inserted

FIGURE 21: Lubricate the outer surface of the sealing ring (12) and assemble it into its position.

FIGURE 22: Lubricate the terminal of the u-joint (13) and install in the steering knuckle.

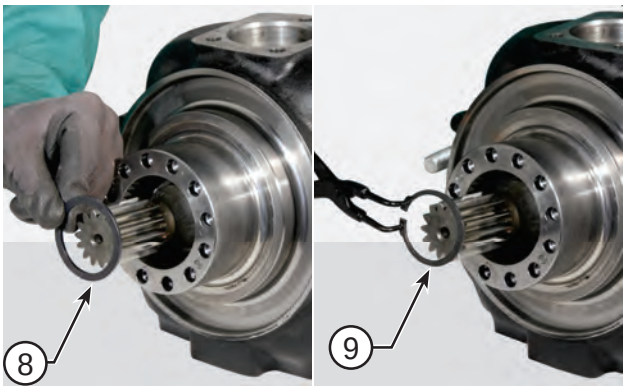


FIGURE 23: Install the shim (9) and snap ring (8) of the steering knuckle.

FIGURE 24: Tighten fully into the hole provided two double joint lifting eyes size M16, connect to suitable lifting gear, and tighten.
Pay attention not to damage the dust cover rings and the sealing rings. Install the steering knuckle.

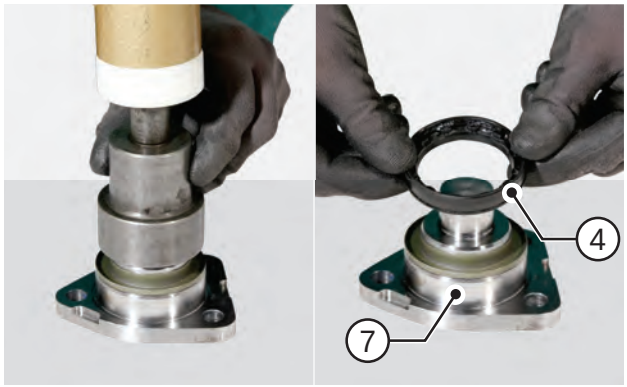


FIGURE 25: Using a drift, insert the front seal thrust plate (4). Lubricate the surface of the sealing ring (4) and assemble it into position.
Carefully check that the rings (4) are properly oriented.

FIGURE 26: Install the bearing (5).

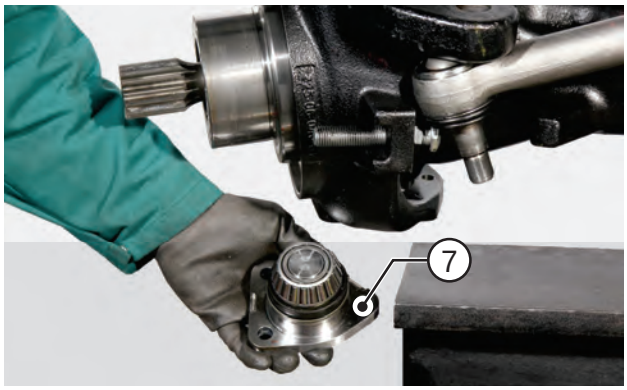


FIGURE 27: Grease generously the bearing (5) and the thrust block (5).
Lubricate with OPTIMOIL grease the contact surfaces of the king pin and steering knuckle.

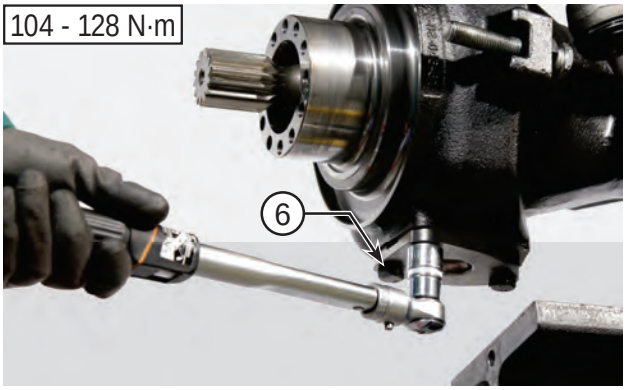


FIGURE 28: Install the king pin (7) with new capscrews (6) of bottom articulation pins in sequence using the criss-cross method.
Torque wrench setting: 104 - 128 N·m.

FIGURE 29: Install the bearing (5).

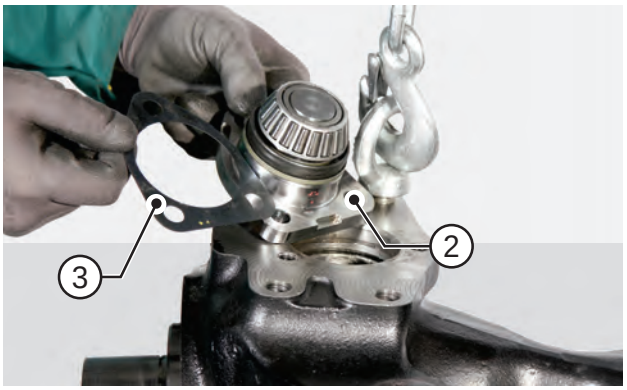


FIGURE 30: Prepare a series of shims (3) of 2.5 mm to be assembled above the upper king pin (2).

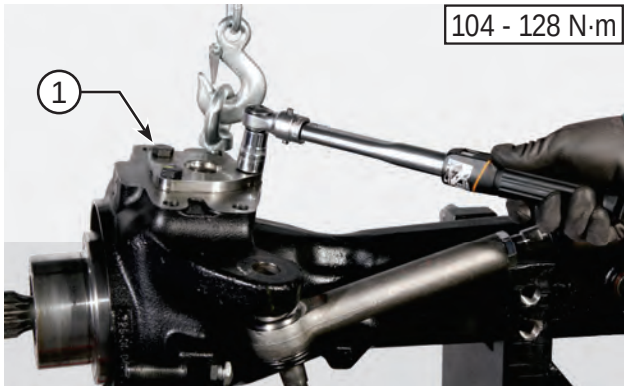


FIGURE 31: Tighten the new capscrews (1) of top king pin (2) in sequence using the criss-cross method.

FIGURE 32: Position a gauge preset it to 1 mm and reset it to zero.

FIGURE 33: Check vertical gap using a lever.

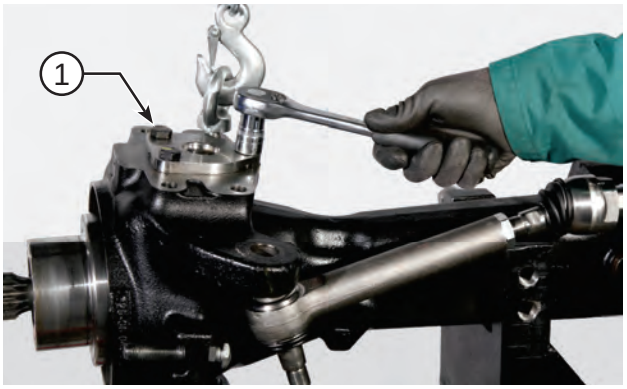


FIGURE 34: Loosen and remove the capscrews (1) from the king pin (2).

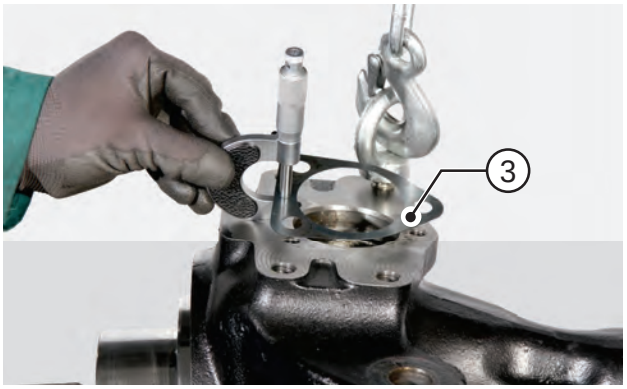


FIGURE 35: Calculate the difference between sizes “First step shim”, “Measured Backlash” and “Preload Draw” so as to obtain the size “S” of the shim (3) that will go under the king pin.
King pin Preload Draw = 0.5 - 0.6 mm
S = First step shim - Measured Backlash - Preload Draw =
Example
First step Shim = 2.5 mm
Measured Backlash = 1 mm
S = 2.5 mm - 1 mm - 0.5 mm = 1 mm
S = 1.0 mm

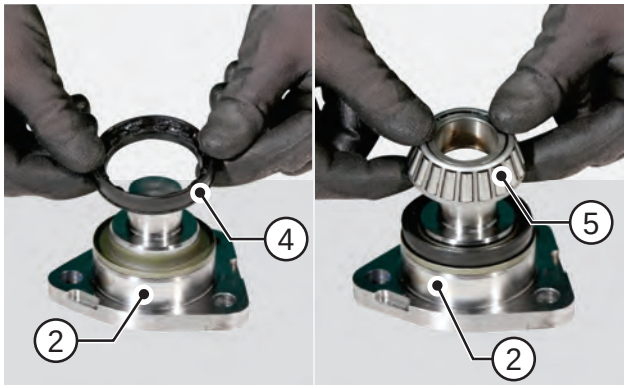


FIGURE 36: Lubricate the surface of the sealing ring (4) and assemble it into position. Carefully check that the rings (4) are properly oriented.
Install the bearing (5).

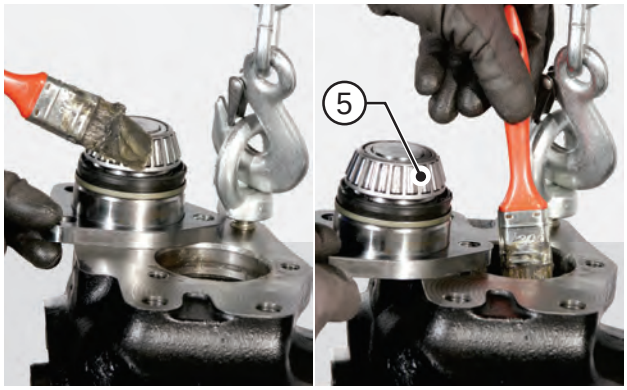


FIGURE 37: Grease generously the bearing (5) and the thrust block (5).

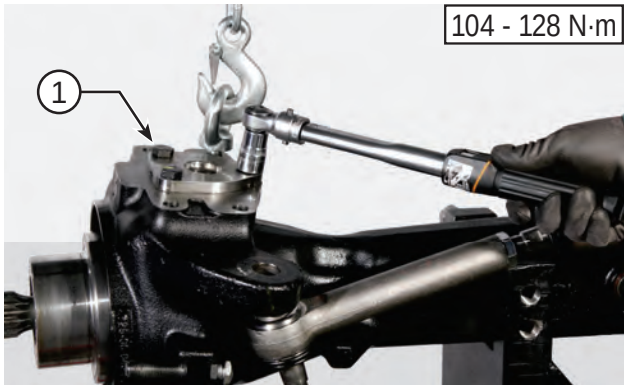


FIGURE 38: Tighten the new capscrews (1) of articulation pins (2) in sequence using the criss-cross method.
Torque wrench setting: 104 - 128 N·m.

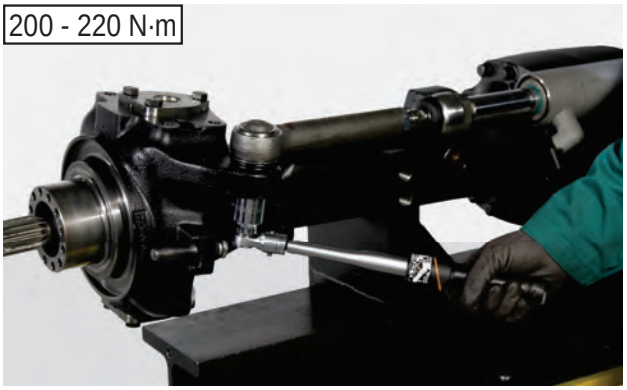


FIGURE 39: Insert the king pins in the steering knuckle and lock into position using a torque wrench setting of 200 - 220 N·m.

⚠CAUTION

Check that rubber guards are intact.

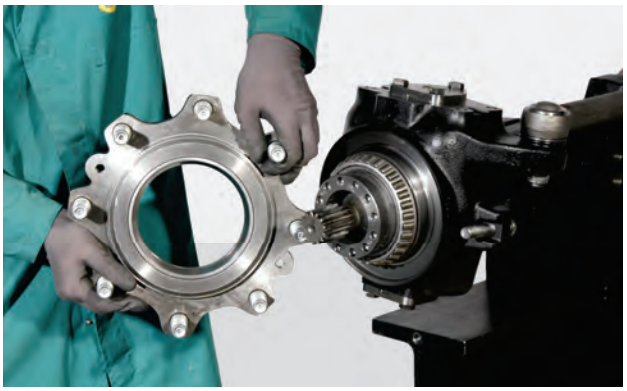
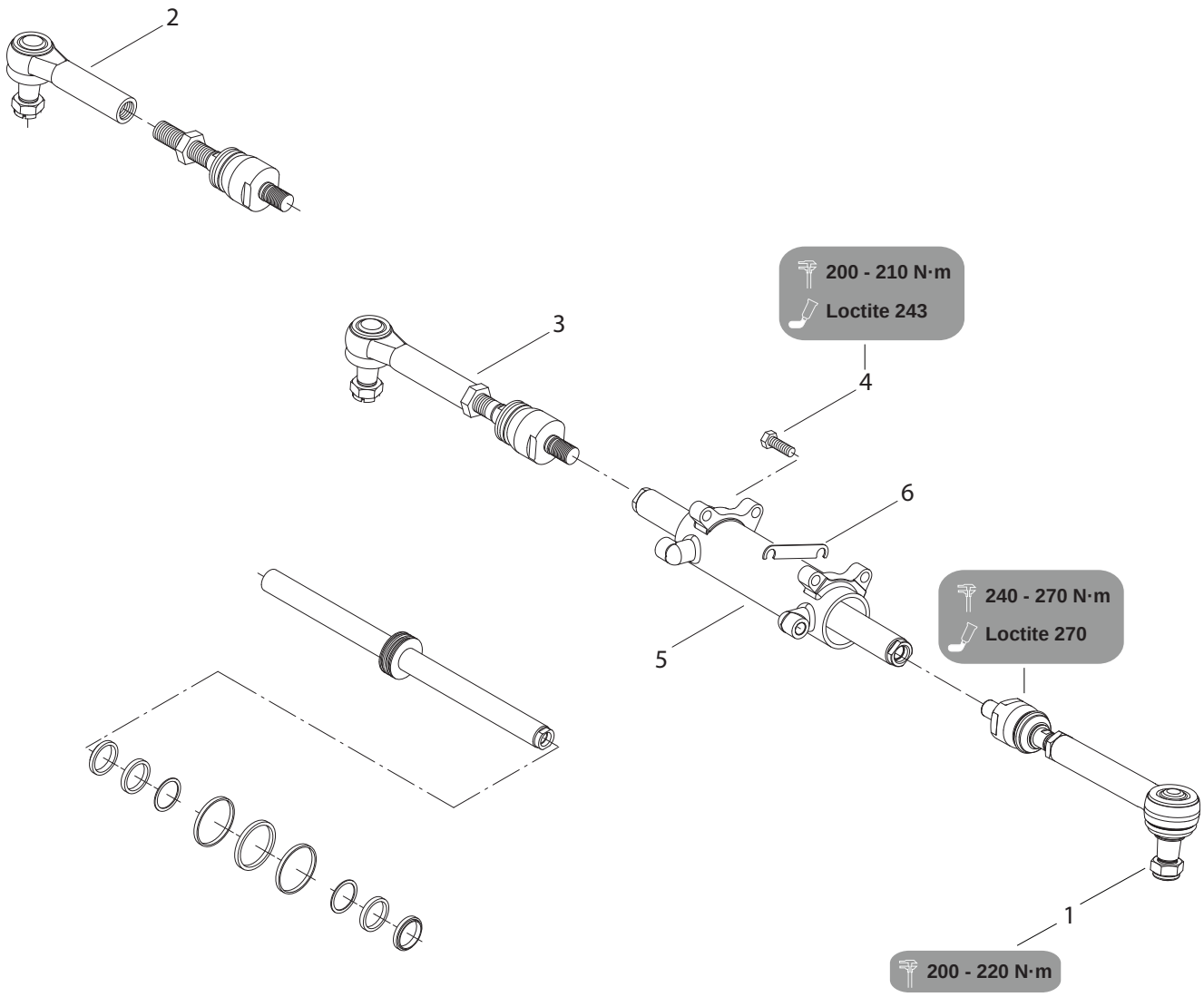


FIGURE 40: Fit the planetary gear cover onto the wheel hub. For details, see PLANETARY REDUCTION GEAR p. 21.

STEERING CYLINDER

EXPLODED VIEW



DISASSEMBLY

FIGURE 1: Remove the nuts (1) that lock the king pins.

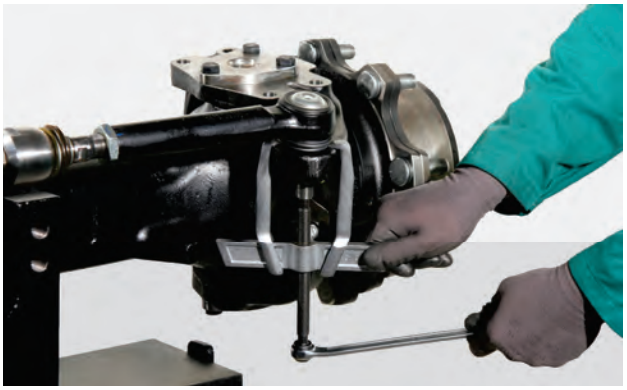


FIGURE 2: Disconnect the tapered pins of the articulation (2) from the steering knuckle using a puller.

FIGURE 3: Disconnect steering bars (3) from the piston.

FIGURE 4: Remove the securing screws (4) from the steering cylinder.

FIGURE 5: Extract the cylinder (5) using a plastic hammer.

⚠CAUTION

Before attempting to disassemble the unit, drain the oil in the cylinder chambers completely.

FIGURE 6: Remove the snap ring of the cylinder head.

⚠WARNING

Personal injury can result when removing snap ring.

The appropriate safety equipment must be worn.

To avoid injury to your eyes, wear protective glasses during this procedure.

FIGURE 7: Hammer the piston on the rear of the head using a plastic hammer until the head is ejected from the cylinder.

FIGURE 8: Remove the snap ring of the cylinder head.

⚠WARNING

Personal injury can result when removing snap ring.

The appropriate safety equipment must be worn.

To avoid injury to your eyes, wear protective glasses during this procedure.

FIGURE 9: Continue hammering until the head is ejected from the cylinder.

FIGURE 10: Remove all seals, anti-extrusion rings, and scraper rings from head, cylinder, and piston.

NOTE:

All seals must be replaced every time the unit is disassembled.

Particular attention must be paid not to damage the seats of both seals and piston slide.

ASSEMBLY

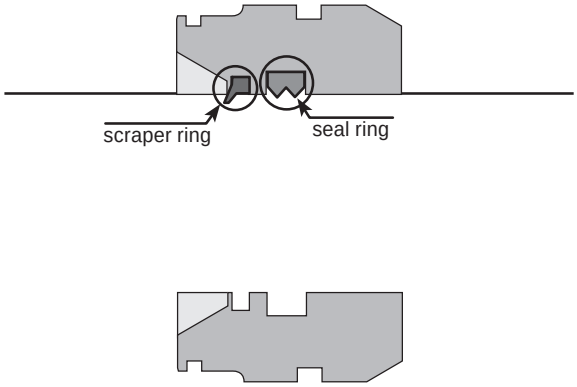


FIGURE 11: After applying grease, install the sealing ring of the shaft, the scraper ring, and the guide ring in the head.

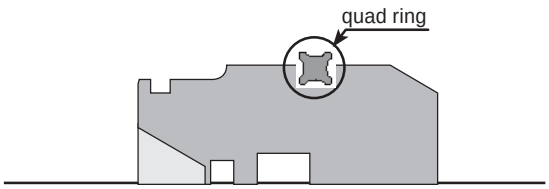


FIGURE 12: Fit the seal and the backup ring onto the outside of the head.

⚠CAUTION

In order to facilitate assembly, apply grease to the outer surface of the piston. Do not roll the seal up.
Thoroughly check that positioning of the backup ring is correct.

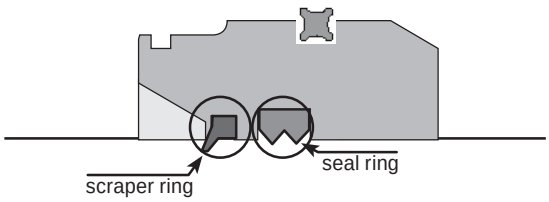


FIGURE 13: After applying grease, install the sealing ring of the shaft and the scraper ring in the head.

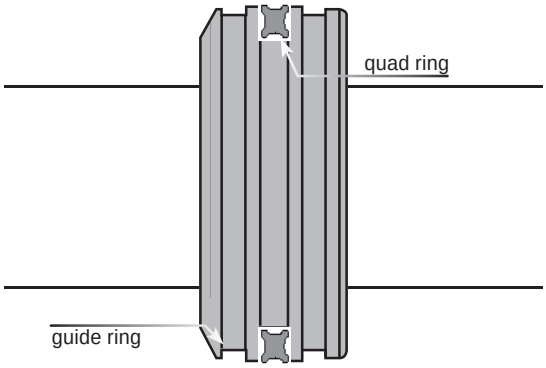


FIGURE 14: Prepare the piston by fitting it with the o-ring and the seal.

⚠CAUTION

In order to facilitate assembly, apply grease.

FIGURE 15: Apply grease to head seals, fit the head onto the piston and push it into the cylinder using a plastic hammer. Introduce the stop ring and ensure that it sets in the seat of cylinder.

NOTE:

Insert the head to line it up with the edge of the cylinder.

FIGURE 16: Push the piston into the cylinder using a plastic hammer.

NOTE:

Apply a little grease to seals and cylinder.

FIGURE 17: Lightly tap the cylinder head with a plastic hammer to push it inside the cylinder

NOTE:

Insert the head to line it up with the edge of the cylinder.

FIGURE 18: Introduce the stop ring and ensure that it sets in the seat of cylinder.

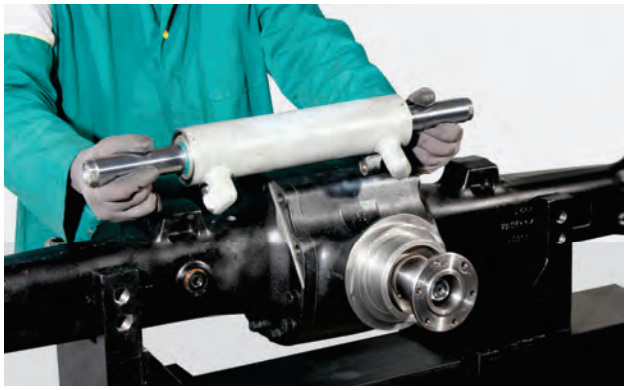


FIGURE 19: Fit the steering cylinder (5) into its seat.

FIGURE 20: Apply Loctite 243 to the threads and tighten the cylinder (5) screws (4) using the criss-cross method. Torque wrench setting: 200 - 210 N·m

FIGURE 21: Install the predefined quote shim (6) (0,3 mm) in its seat, as shown in figure.

⚠CAUTION

Do not install the shim (6) if the gap between steering cylinder and armi is less than the shim (0,3 mm).

FIGURE 22: Apply Loctite 243 to the threads and tighten the cylinder (5) screws (4) using the criss-cross method.
Torque wrench setting: 200 - 210 N·m

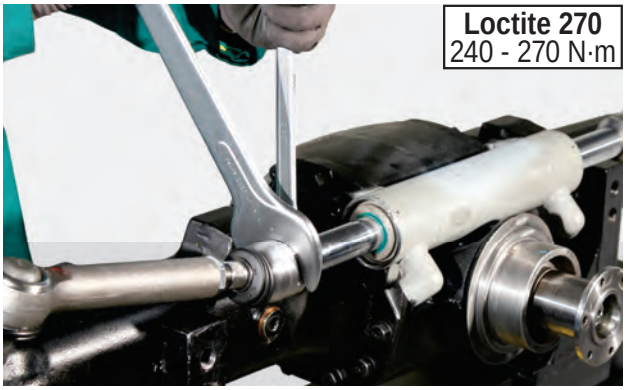


FIGURE 23: Apply Loctite 270 to the threads and connect the steering bars (3) by tightening the terminals onto the piston stem.
Torque wrench setting: 240 - 270 N·m

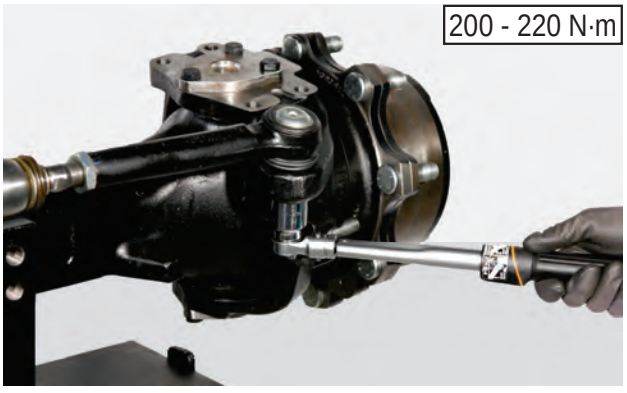


FIGURE 24: Insert the pins (2) in the steering case and lock into position using a torque wrench setting of 200 - 220 N·m.

⚠CAUTION

Check that rubber guards are intact.

FIGURE 25: Center the piston by slowly moving it first in one direction then in the other and position it half way on the stroke.

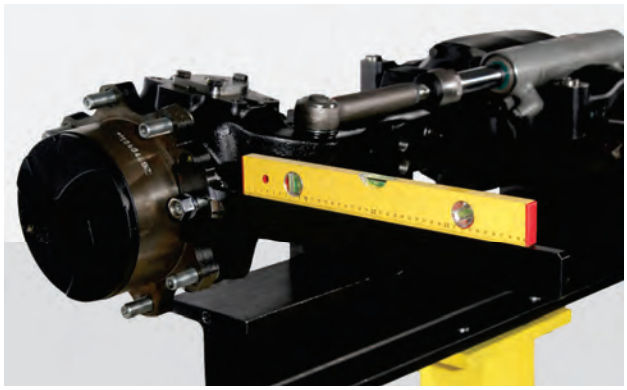


FIGURE 26: Apply tools T6 (See drawing T6 p. 76) to the hubs and lock them. Using a level, check that tools are perfectly flat.

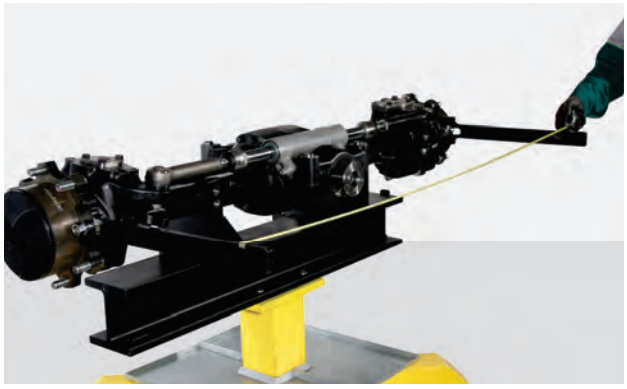


FIGURE 27: Without moving the piston, check front and rear distance at the edge of tools.
Maximum difference = 2 mm

NOTE:

In order to check the rear distance, rotate the bevel pinion and check that tools are flat.

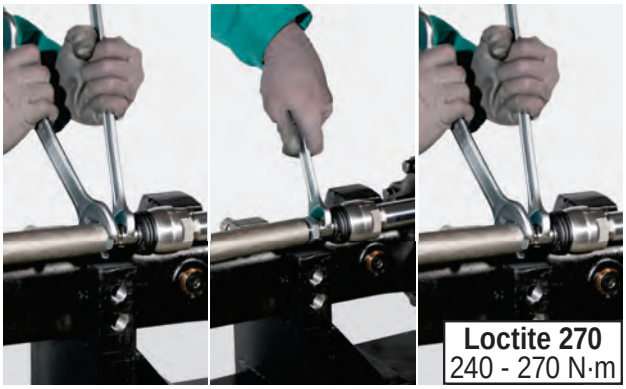


FIGURE 28: CONVERGENCY ADJUSTMENT
Loosen the nuts and tighten them onto the ball-and-socket joints. Hold the articulations still and rotate the ball-and-socket joints. Once the convergency has been adjusted, lock the nuts.
Torque wrench setting for nuts: 240 - 270 N·m

NOTE:

Adjust by the same amount on each steering rod.

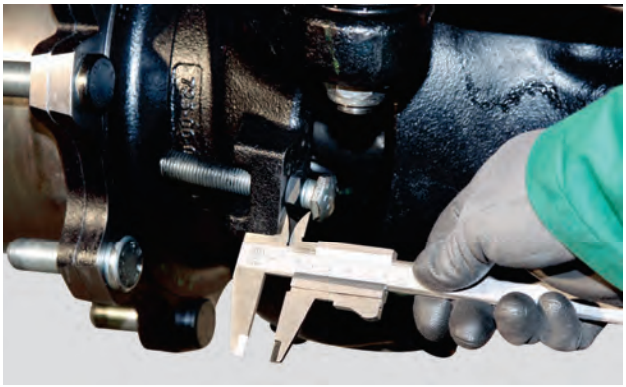
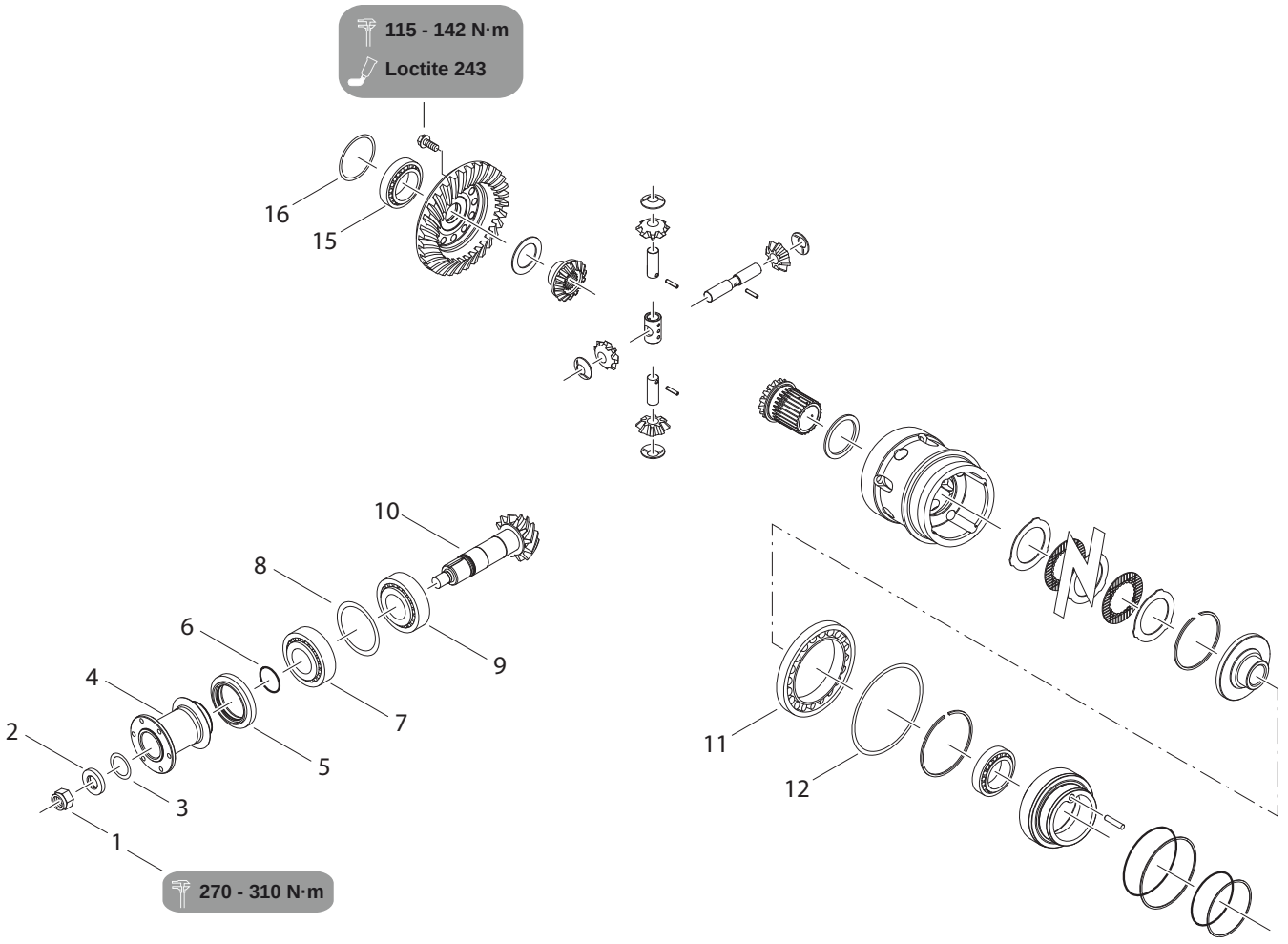


FIGURE 29: ADJUSTING THE STEERING ANGLE
Insert the end stroke screws and adjust to 59 mm.

BEVEL PINION

EXPLODED VIEW



DISASSEMBLY

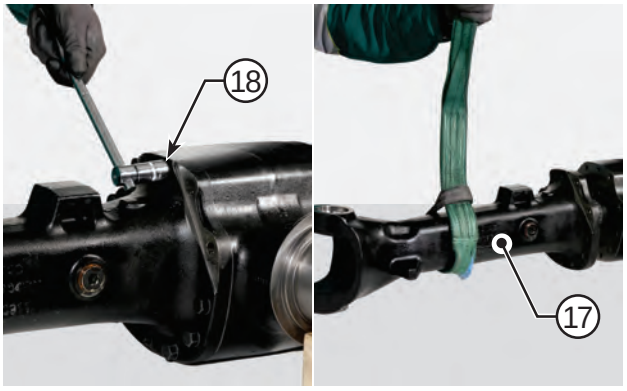


FIGURE 1: Connect a suitable lifting system. Loosen and remove the screws (18) securing the arm to the body. Remove the arm.

FIGURE 2: Use a screwdriver to remove the o-ring.

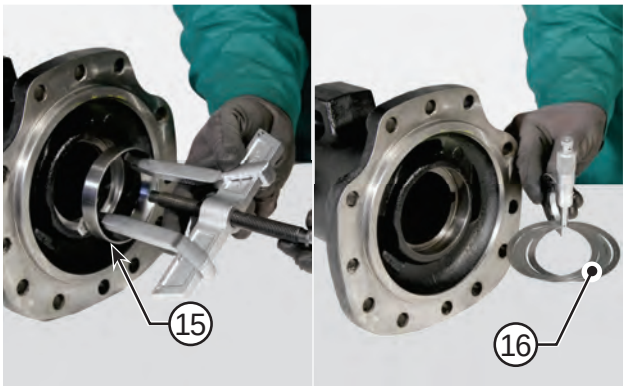


FIGURE 3: Using a puller, remove the thrust block of the bearing (15) from the arm.
Remove the shims (16) located under the outer thrust block of the bearing (15).

FIGURE 4: Extract the complete differential unit.

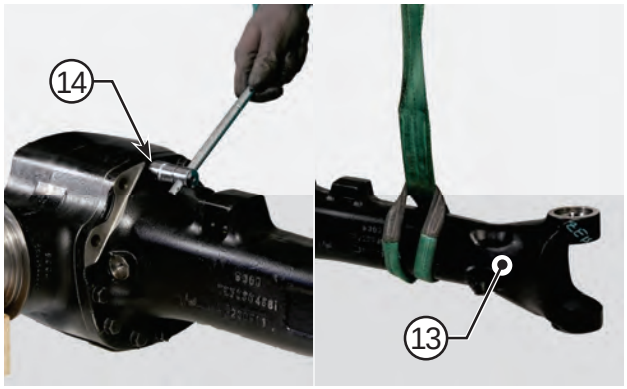


FIGURE 5: Connect a suitable lifting system to the second arm. Loosen and remove the screws (14) securing the arm to the body. Remove the arm.

FIGURE 6: Use a screwdriver to remove the o-ring.

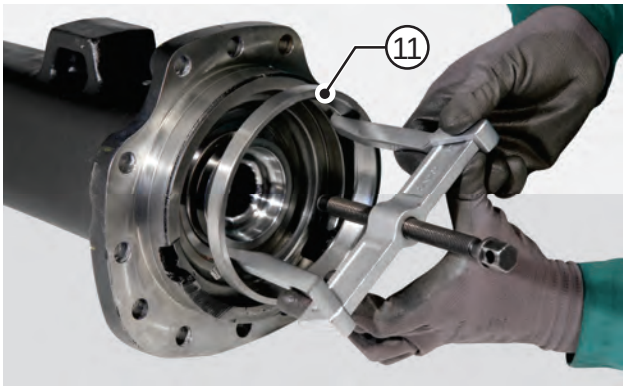


FIGURE 7: Using a puller, remove the thrust block of the bearing (11) from the arm.
Remove the shims (12) located under the outer thrust block of the bearing (11).

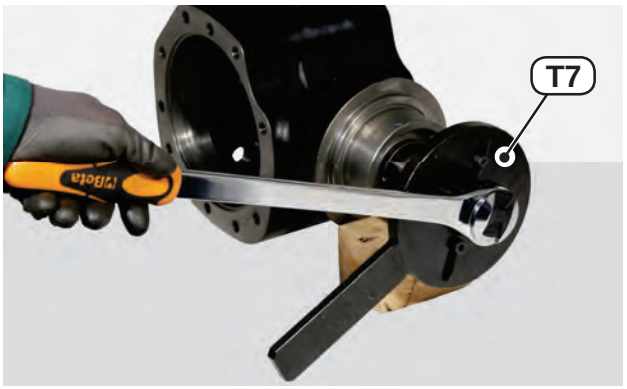


FIGURE 8: Use the T7 (See drawing T7 p. 77) special wrench on the flange (4) and loosen the nut (1).

NOTE:

If disassembly is difficult, heat the nut (3) at approximately 176 °F [80 °C].

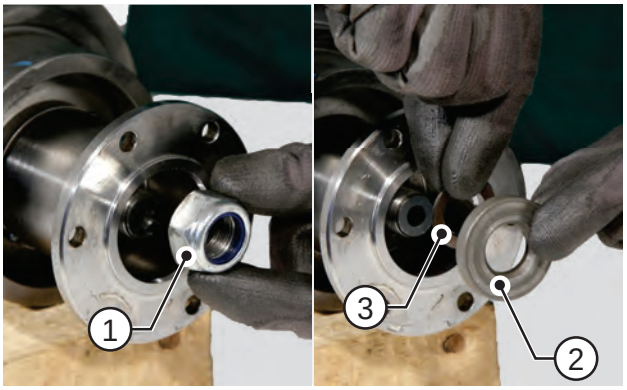


FIGURE 9: Loosen and remove the nut (1), washer (2) and shims (3).

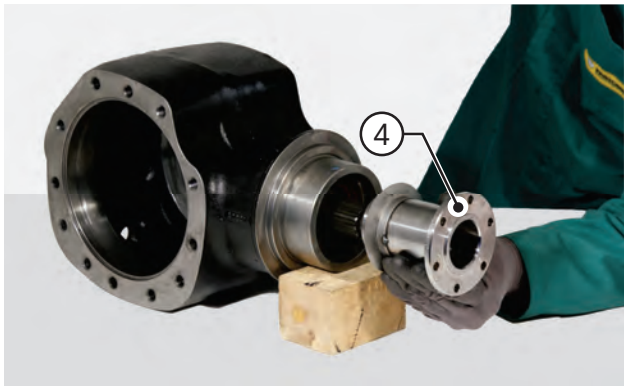


FIGURE 10: Remove the flange (4).

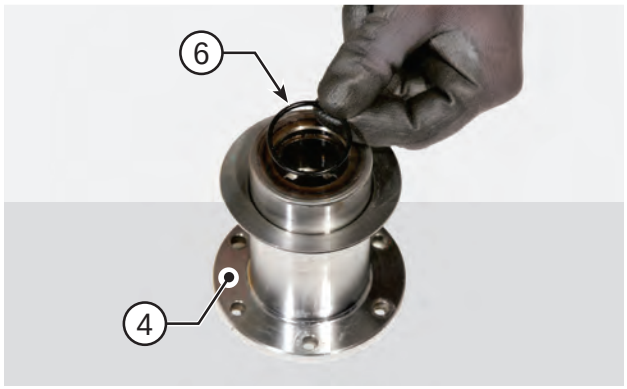


FIGURE 11: Use a screwdriver to remove the o-ring (6).

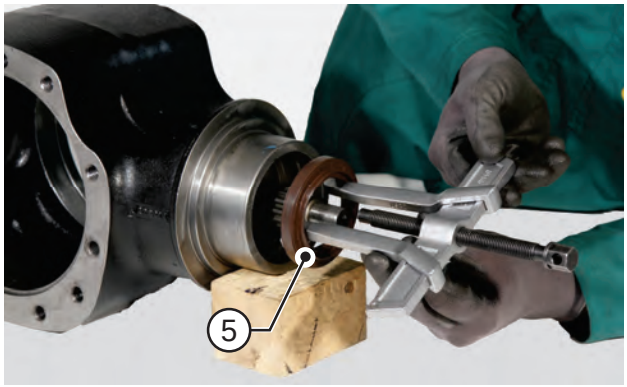


FIGURE 12: Using an internal extractor, remove the seal ring (5).

⚠CAUTION

Take care not to damage the seal ring seating.

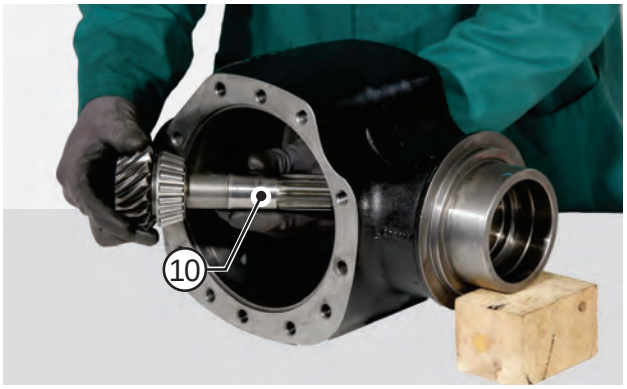


FIGURE 13: Using a plastic hammer, remove the pinion (10).

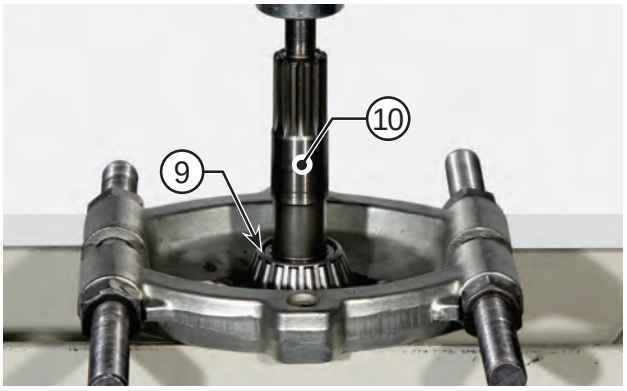


FIGURE 14: Using a puller and a press, remove the inner bearing (9) from the pinion (10).

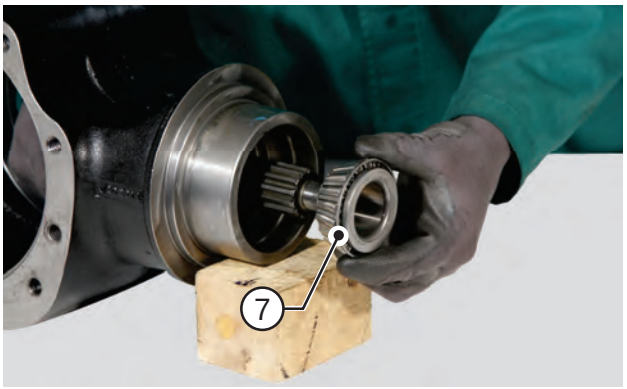


FIGURE 15: Extract the bearing (7).

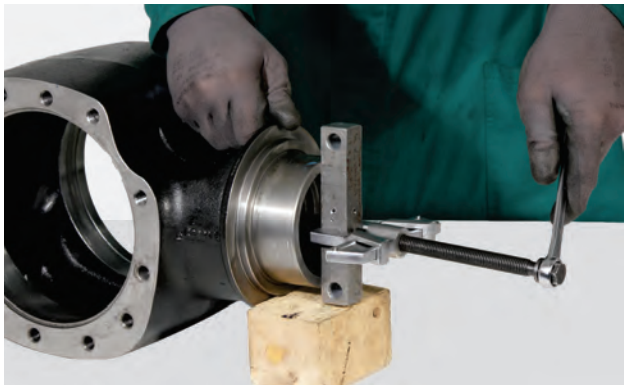


FIGURE 16: Using an internal extractor, remove the thrust blocks (7, 9).

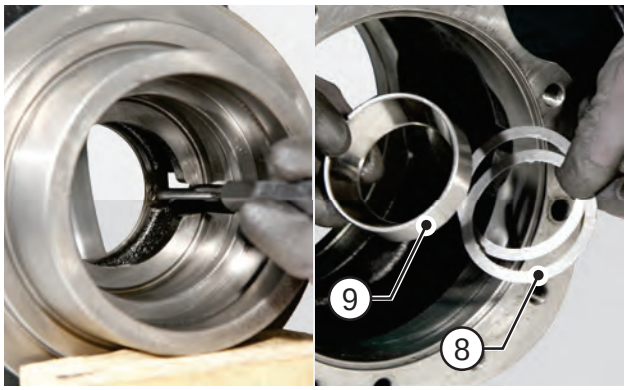


FIGURE 17: Using an internal extractor, remove the thrust block of the internal bearing (9) as well as the shim washers (8).

ASSEMBLY

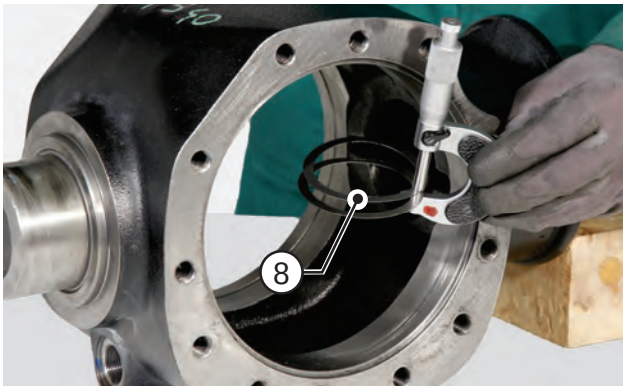


FIGURE 18: Check the thickness of first step pinion shims (8).
Example: A = 1.1 mm

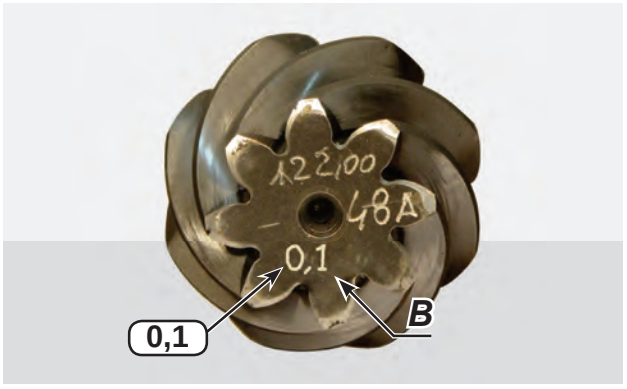


FIGURE 19: Check nominal dimension “B” as marked on the old pinion.
Execute the calculation following the indicated formula to obtain the necessary value to the successive calculation.
C = A ± B
Example: C = 1.1 - 0.1 = 1 mm

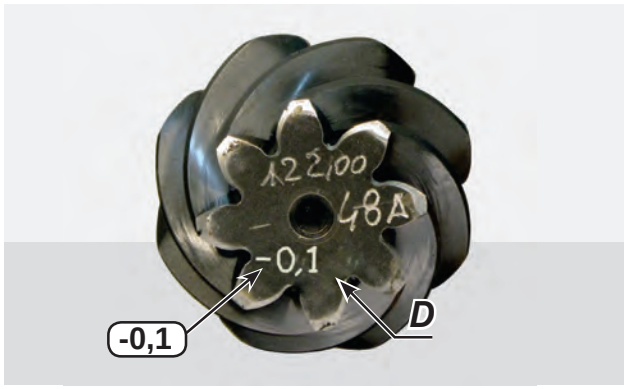


FIGURE 20: Check nominal dimension “D” as marked on the new pinion.
Execute the calculation following the indicated formula to obtain the value of necessary shims.
S = C - (D)
Example: S = 1 - (+0.1) = 0.9 mm

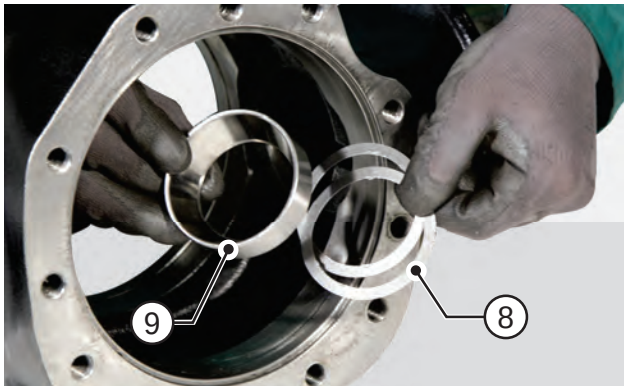


FIGURE 21: Partially insert the thrust block of the bearings (7, 9).

NOTE:

The smaller shims (8) must be placed in between the thicker ones.

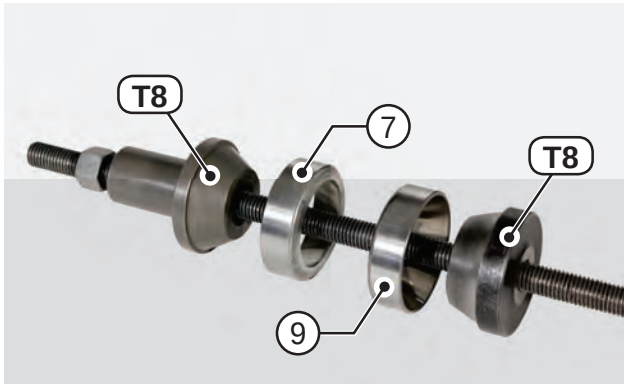


FIGURE 22: Install tension rod and guidetool T8 (See drawing T8 p. 78) on the thrust block of the external (7) and inner (9) bearing.

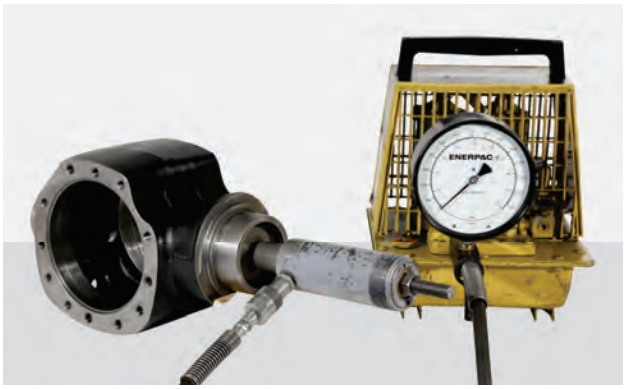


FIGURE 23: Connect the tension rod to the press and move the thrust block of the bearing (7, 9) into its seat. Disconnect the press and remove the tension rod.

NOTE:

Before starting the next stage, make sure the thrust block has been completely inserted into its seat.

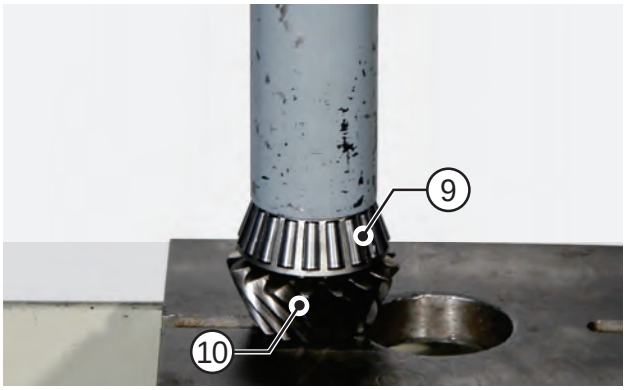


FIGURE 24: Heat the inner bearing (9) to about 212 °F [100 °C] and fit it to the pinion (10).

NOTE:

Once the bearing has cooled down, lightly lubricate bearing (11) with SAE85W90 oil.

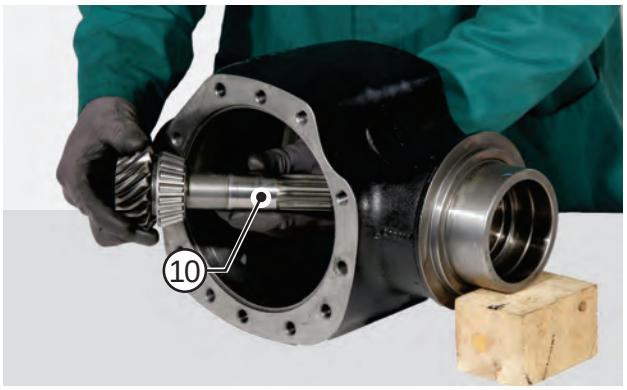


FIGURE 25: Fit the pinion (10) in the central body.

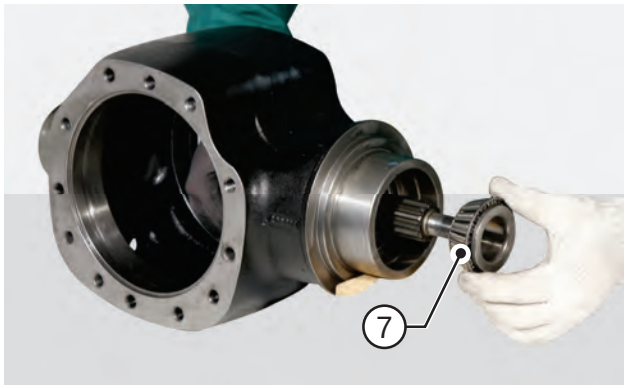


FIGURE 26: Heat the outer bearing (7) to a temperature of about 176 °F [80 °C] and fit it onto the pinion (10).

NOTE:

Lightly lubricate bearing (7) with SAE85W90 oil.

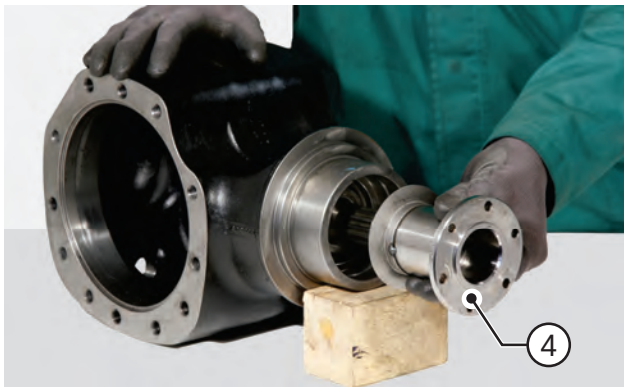


FIGURE 27: Install the flange (4) onto the pinion (10) without the sealing ring (5).

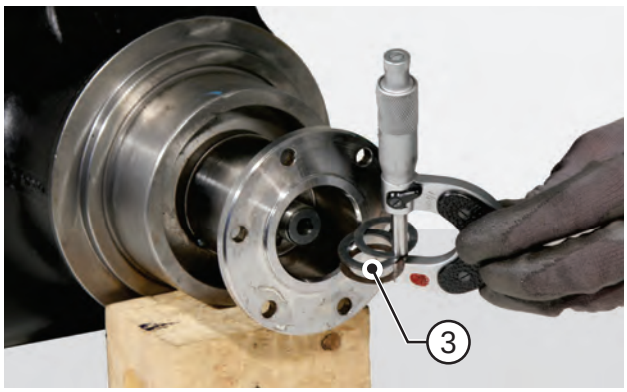


FIGURE 28: Install the first step pinion shims S1 (3). Example: S1 = 1.6 mm

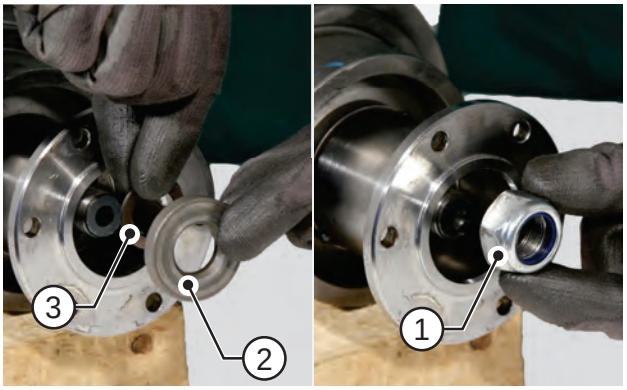


FIGURE 29: In order to hold the shim (3) in position, apply grease to it. Assemble shims (3), washer (2), and nut (1).

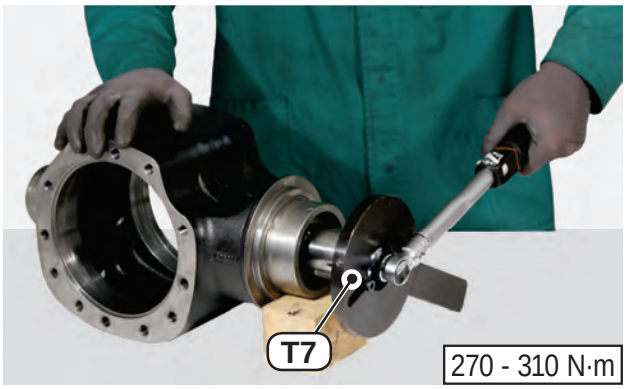


FIGURE 30: Apply the T7 (See drawing T7 p. 77) tool onto the flange (4).
Lock the wrench and tighten the nut using a torque wrench, up to a minimum required torque setting of 270 - 310 N·m.

FIGURE 31: Apply onto the pinion (10) the bar hold and using a torque meter, check the torque of the pinion. Torque: 0.6 - 1.6 N·m.

⚠CAUTION

If torque exceeds the maximum value, then the size of shim "S1" (3) needs to be increased.

If torque does not reach the minimum value, then the size of shim "S1" (3) needs to be reduced.

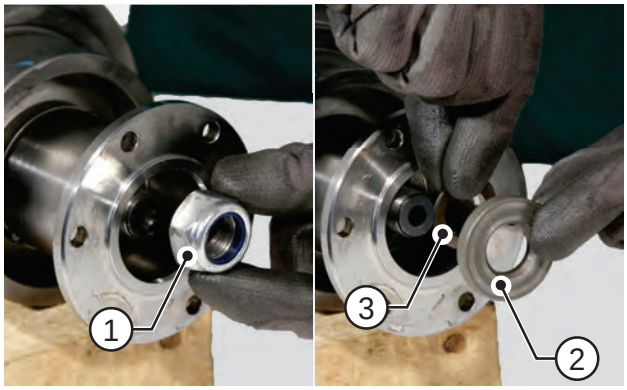


FIGURE 32: Loosen and remove the nut (1), washer (2) and shims (3).
Remove the flange (4).

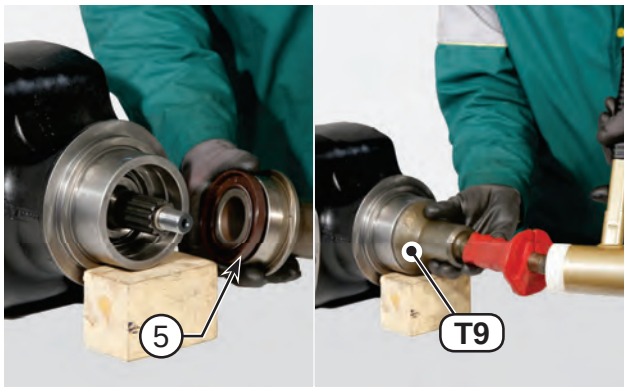


FIGURE 33: Lubricate and fit the sealing ring (5) onto tool T9 (See drawing T9 p. 79).
Install the ring into the seat.

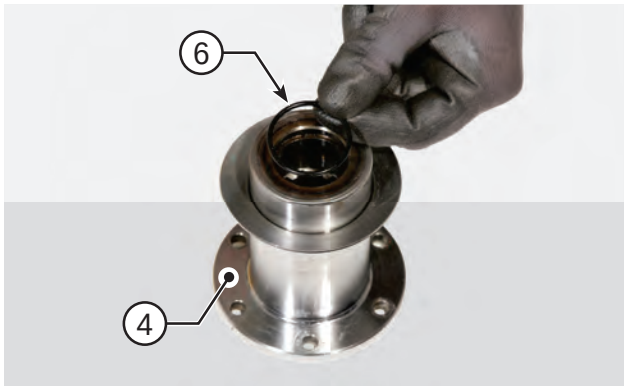


FIGURE 34: Replace the outer o-ring (6).

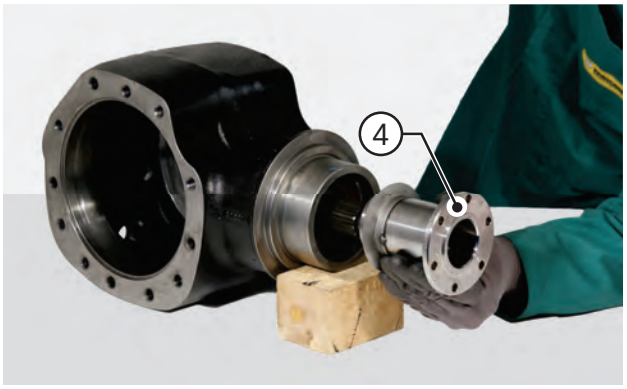


FIGURE 35: Install the flange (4) onto the pinion.

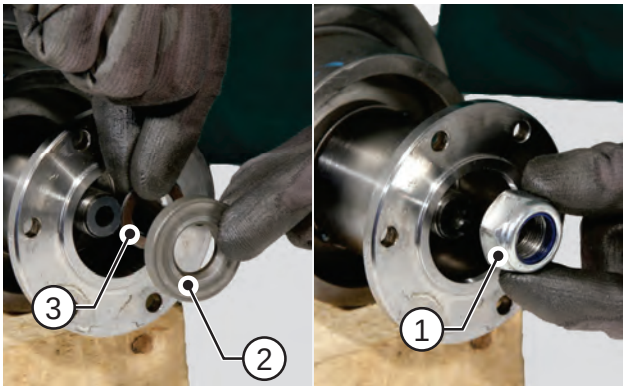


FIGURE 36: In order to hold the shim (3) in position, apply grease to it.
Assemble shims (3), washer (2), and nut (1).

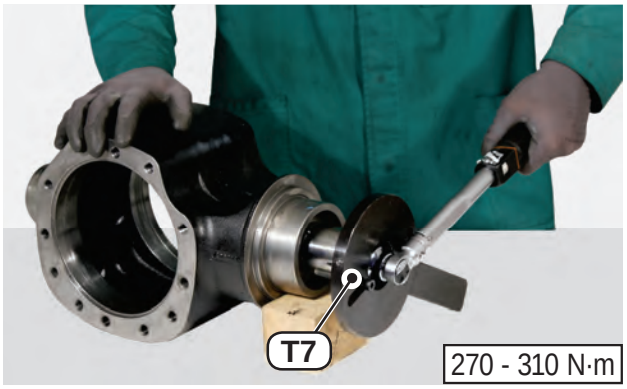


FIGURE 37: Apply the T7 (See drawing T7 p. 77) tool onto the flange (4).
Lock the wrench and tighten the nut using a torque wrench, up to a minimum required torque setting of 270 - 310 N·m.

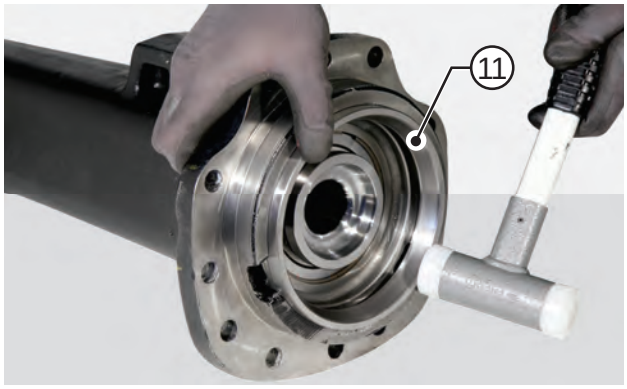


FIGURE 38: Fit the bearing disc (11), complete with shims (12) in the intermediate cover.

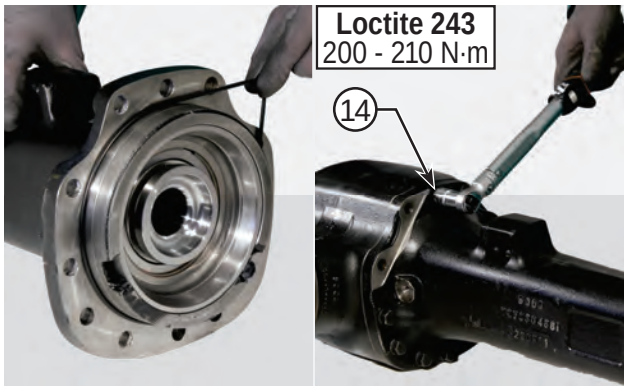


FIGURE 39: Insert a new o-ring on the centering diameter of the arm.
Position the arm on the central body.
Tighten nuts (14) in two stages, using the criss-cross method.

FIGURE 40: Install the complete differential unit.

FIGURE 41: Insert thrust block of the bearing shims (16) of an initial thickness of about 1.30 mm.

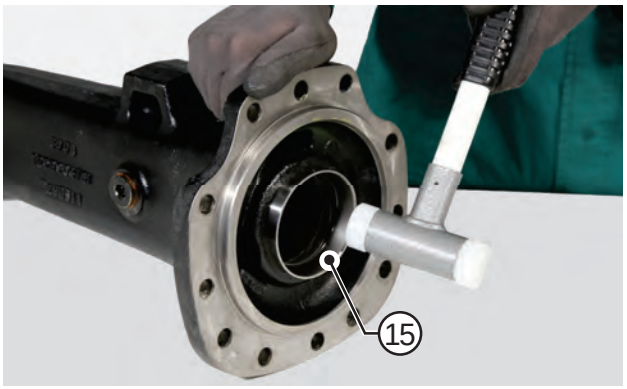


FIGURE 42: Fit the bearing disc (15) complete with shims (16) in the intermediate cover.

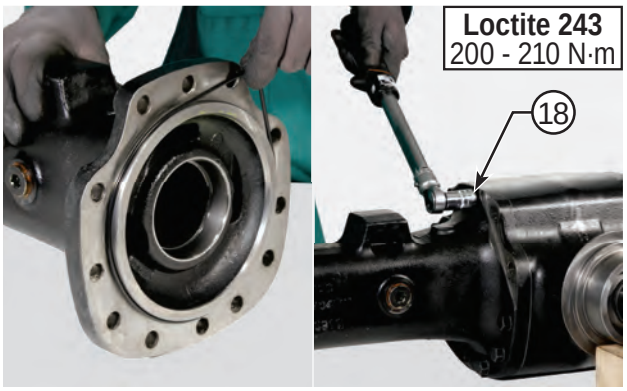


FIGURE 43: Insert a new o-ring on the centering diameter of the arm.
Position the arm on the central body.
Tighten nuts (18) in two stages, using the criss-cross method.

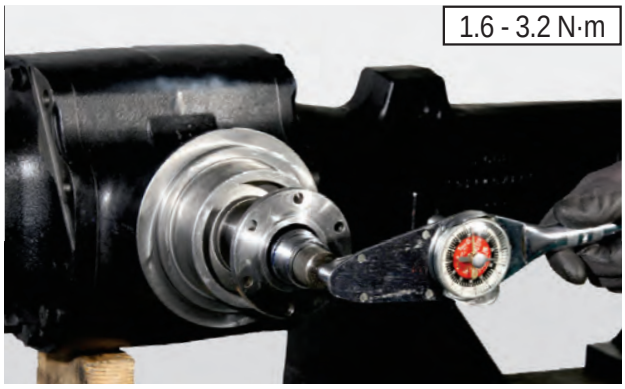


FIGURE 44: Apply onto the pinion a torque metre and check that torque will increase by 1 - 1.5 N·m as a result of differential bearing preload.
Example: pinion torque: 0.6 - 1.6 N·m
Pinion + differential torque: 1.6 - 3.2 N·m.

⚠CAUTION

If bearings are not new, check the static torque; if bearings are new, check the continuous torque.

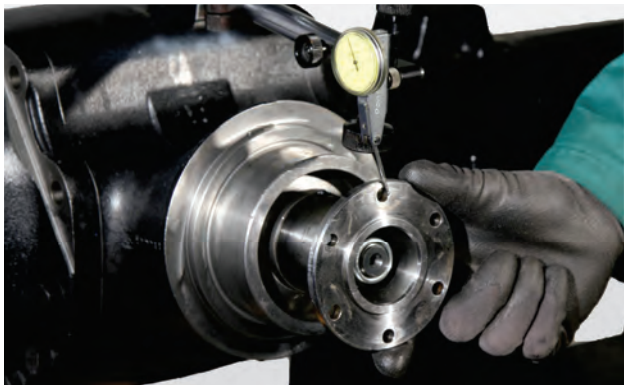
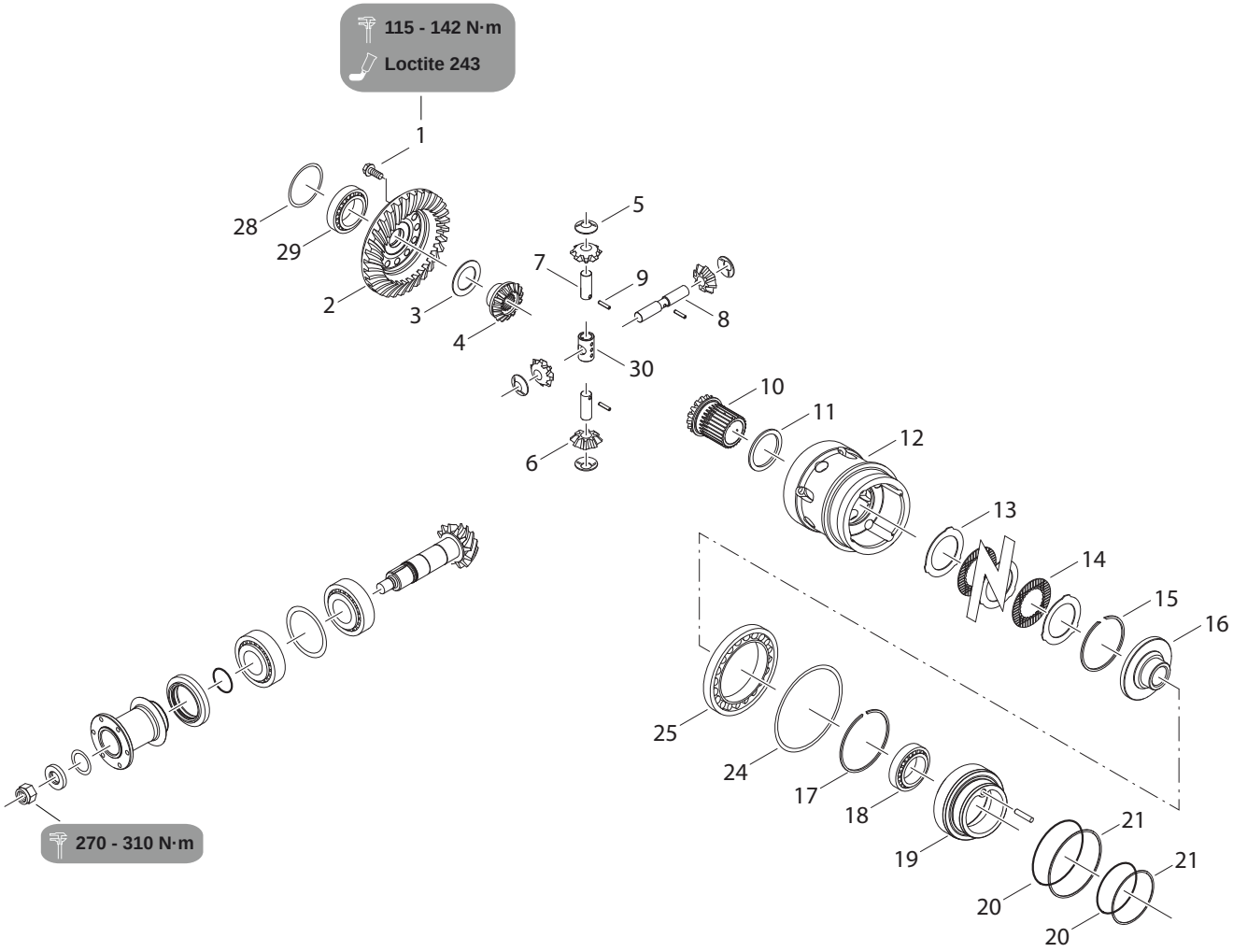


FIGURE 45: Install a dial indicator as shown and shift the flange to check the tolerance between the bevel gear teeth. Check the backlash at the input flange bolt hole. (B.C.D. 42 mm)
Tolerance: 0,25 - 0,35 mm

HYDROLOCK DIFFERENTIAL UNIT

EXPLODED VIEW



DISASSEMBLY

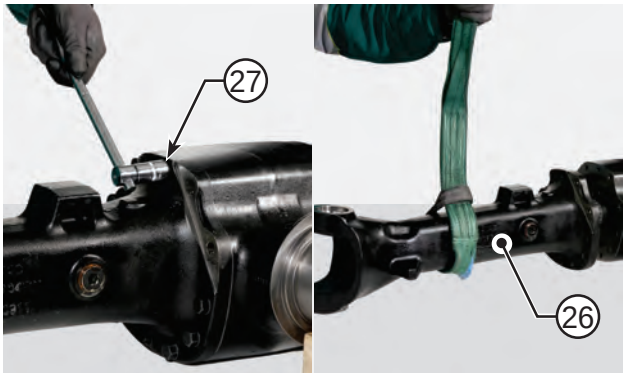


FIGURE 1: Connect a suitable lifting system. Loosen and remove the screws (27) securing the arm to the body. Remove the arm.

FIGURE 2: Extract the complete differential unit.

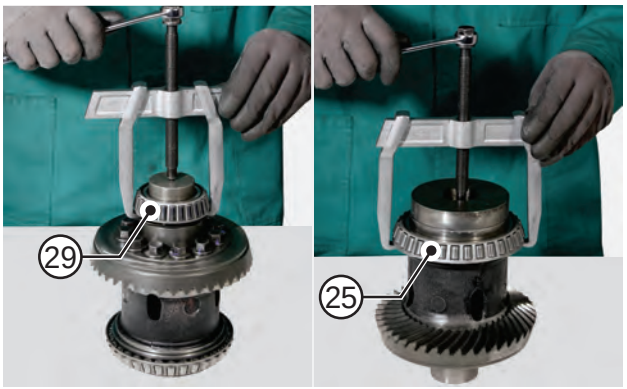


FIGURE 3: Extract the bearings (25, 29) from the differential carrier.

⚠CAUTION

If disassembly is carried out in order to replace crown wheel and pinion, bearings, or planetary gear, break up distance washers and calculate clearances as indicated in the sections regarding removal, disassembly, assembly and installation of differential unit and bevel pinion.

FIGURE 4: Remove the snap ring (15).

⚠WARNING

Personal injury can result when removing snap ring.

The appropriate safety equipment must be worn.

To avoid injury to your eyes, wear protective glasses during this procedure.

FIGURE 5: Remove the hydraulic block discs (13, 14) one after the other.

FIGURE 6: Remove the capscrews (1) of the crown (2). Note the position of assembly.

FIGURE 7: Remove the crown (2).

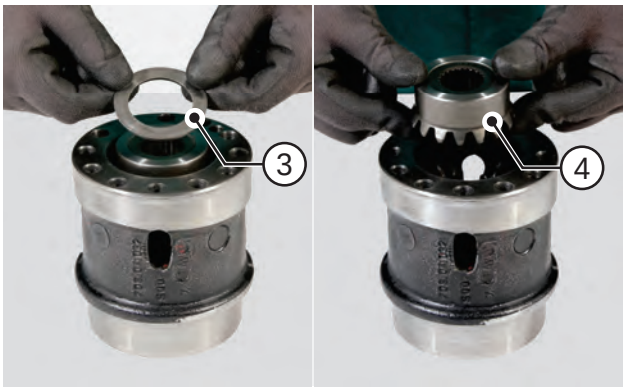


FIGURE 8: Remove the shim washer (3) and the planetary gear (4).

FIGURE 9: Remove the three spider blocking pins (9) by using a pin driver.

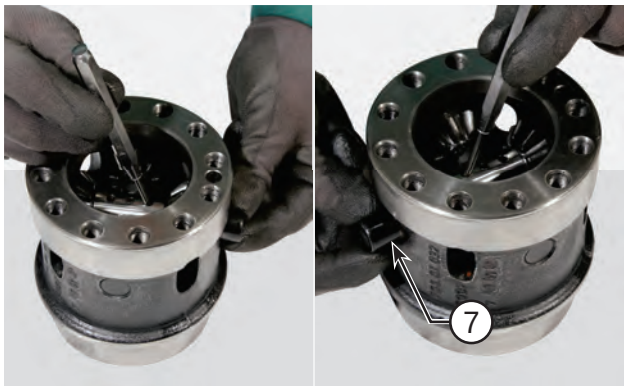


FIGURE 10: Move the two opposite mounted short bolts (7) to the outside of the box using the same pin driver.

FIGURE 11: Remove the bolts using a drift (8).

FIGURE 12: Remove the cross bolts (30).

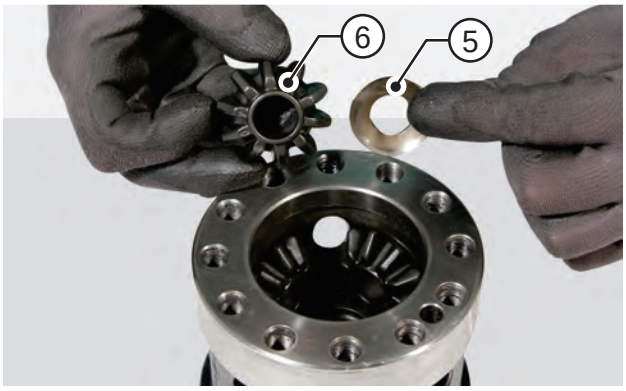


FIGURE 13: Remove the two half bolts (7), spherical washers (5) and satellite gears (6).

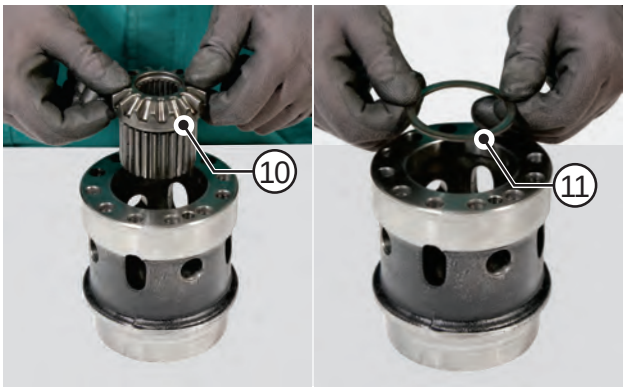


FIGURE 14: Remove the shim washer (11) and the planetary gear (10).

FIGURE 15: Connect a suitable lifting system to the second arm. Loosen and remove the screws (22) securing the arm to the body. Remove the arm.

FIGURE 16: Using a puller, remove the thrust block of the bearing (25).
Remove the shims (24) located under the outer thrust block of the bearing (25).

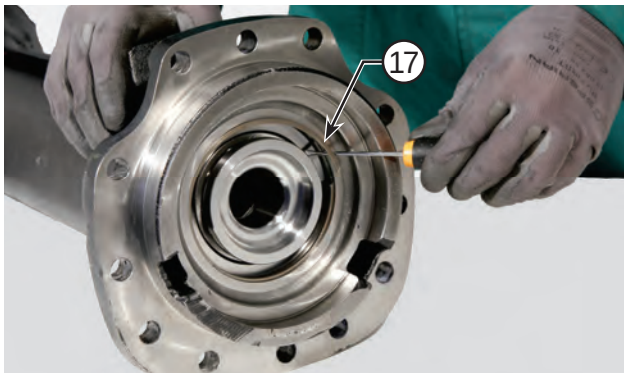


FIGURE 17: Remove the snap ring (17).

⚠WARNING

Personal injury can result when removing snap ring.
The appropriate safety equipment must be worn.
To avoid injury to your eyes, wear protective glasses during this procedure.

FIGURE 18: Mark the position of assembly.

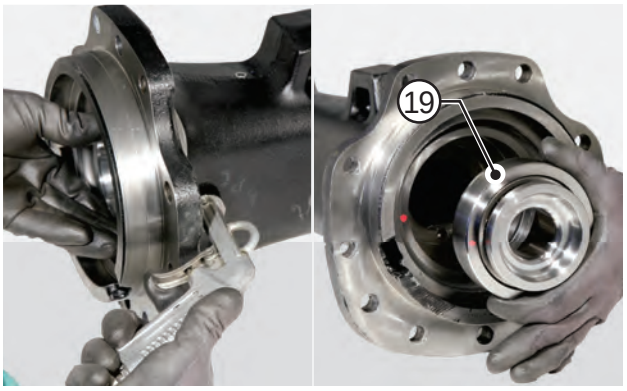


FIGURE 19: Slowly introduce compressed air via the differential lock inlet to extract the piston (19).

⚠WARNING

This operation is postentially dangerous. Retain the piston as it may be expelled rapidly and damaged.

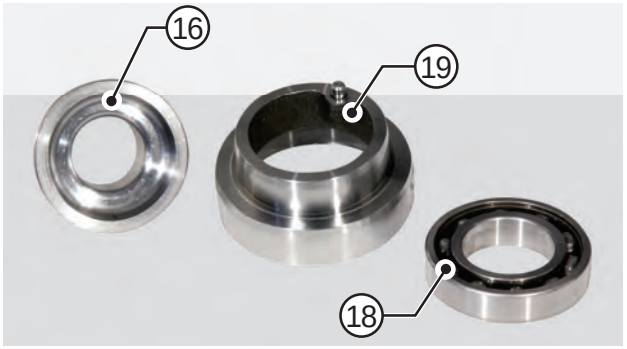


FIGURE 20: Position the complete piston under a press and disassemble flange (16), bearing (18), and piston (19).

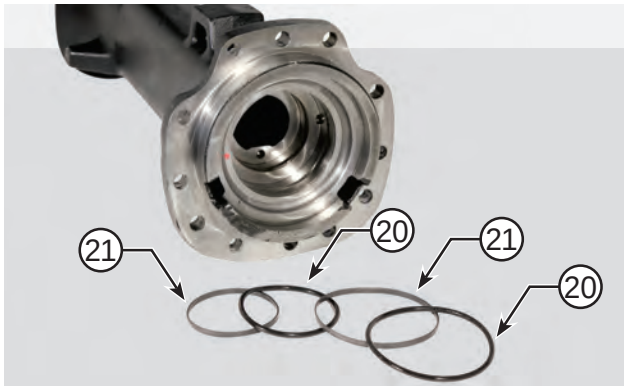


FIGURE 21: Remove rings (20, 21) from cylinder.

NOTE:

All seals must be replaced every time the unit is disassembled.

Particular attention must be paid not to damage the seats of both seals and piston slide.

ASSEMBLY

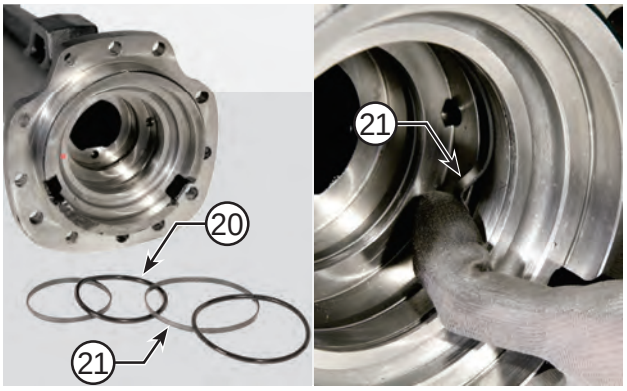


FIGURE 22: After applying grease, install the o-ring (20, 21) inside the cylinder.

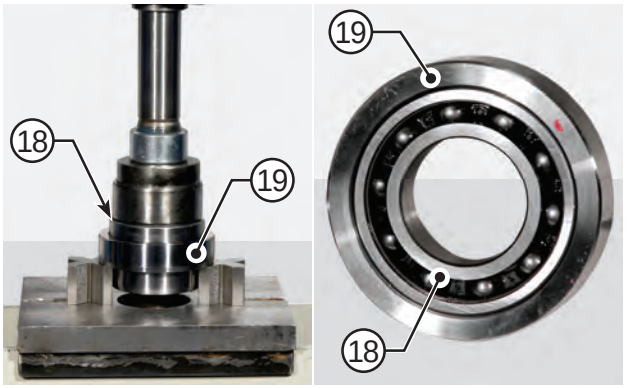


FIGURE 23: Position the bearing (18) in the piston (19) and press all the way down.

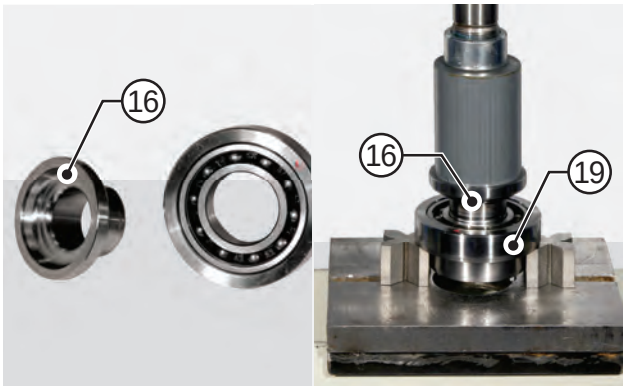


FIGURE 24: Position the flange (16) in the bearing (18) and press all the way down.

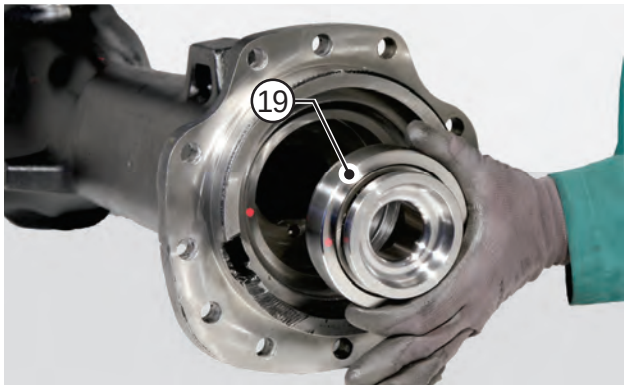


FIGURE 25: Lubricate the piston seating and install the piston pack.
Tap lightly with a mallet to seat the piston (19) completely. Note the position of assembly.

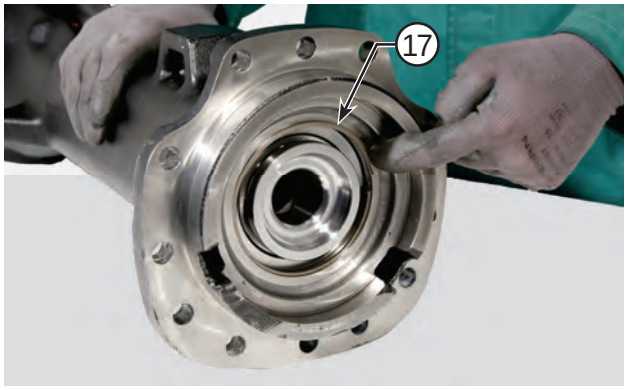


FIGURE 26: Install the snap ring (17).

⚠WARNING

Personal injury can result when installing snap ring.
The appropriate safety equipment must be worn.
To avoid injury to your eyes, wear protective glasses during this procedure.

NOTE:

Make sure the ring is properly set in its seat.

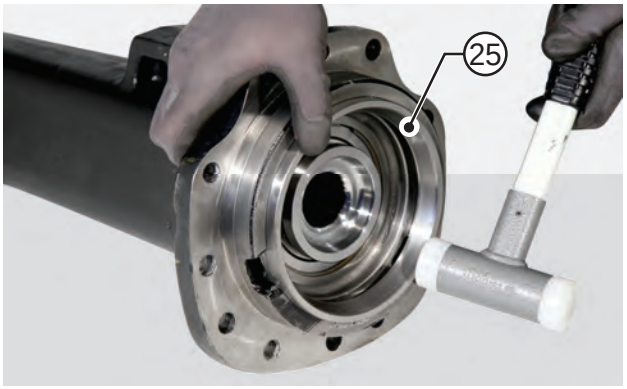


FIGURE 27: Insert the thrust block (25) and the shims (24).

NOTE:

For the regulation of the pre-charge bearings, use the original shims pack distance.

FIGURE 28: Insert a new o-ring on the centering diameter of the arm.
Position the arm on the central body.
Tighten nuts (22) in two stages, using the criss-cross method.

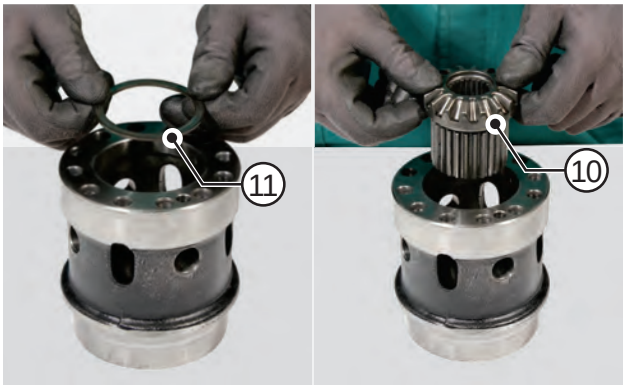


FIGURE 29: Insert planetary gear (10) together with washer (11).

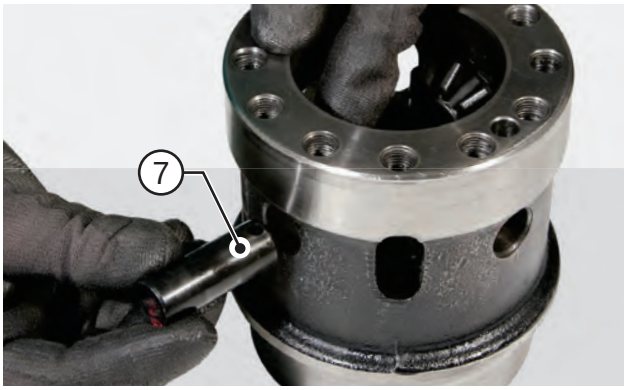


FIGURE 30: Insert the two half bolts (7), spherical washers (5), and satellite gears (6).

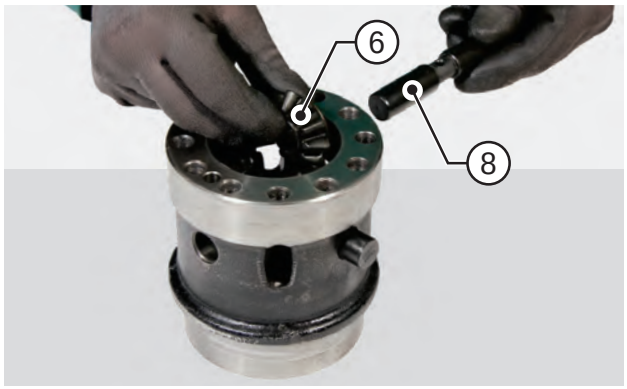


FIGURE 31: Partially insert the long bolt (8), satellite gears (6), and spherical washers (5).

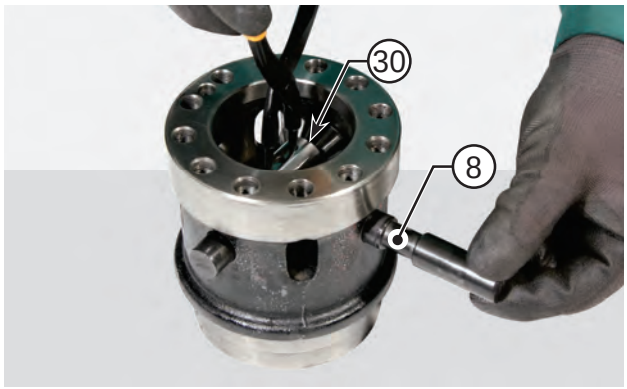


FIGURE 32: Insert the crossbolt (30) in the correct position.

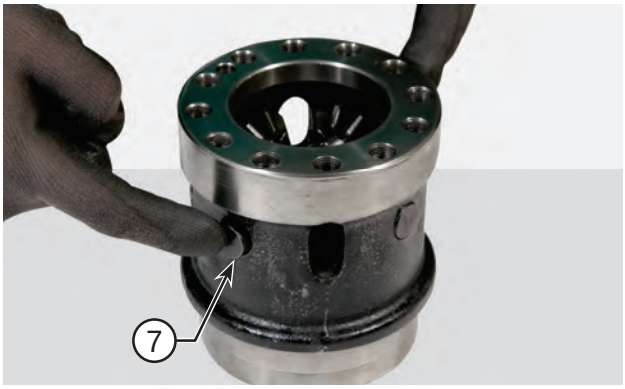


FIGURE 33: Position satellite wheels (6), spherical washers (5) and completely insert the long bolt (8).

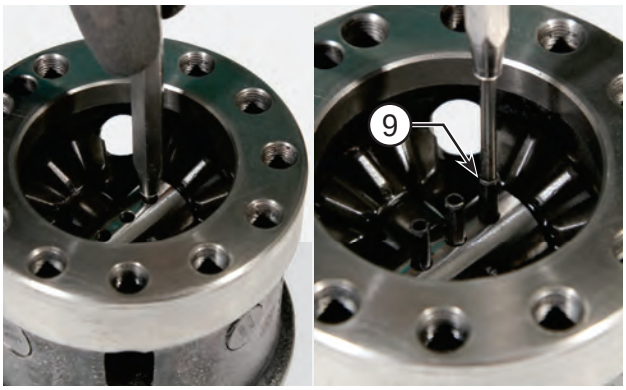


FIGURE 34: Bring the pin holes in line using a pin-driver. Insert pins (9) to end of stroke.

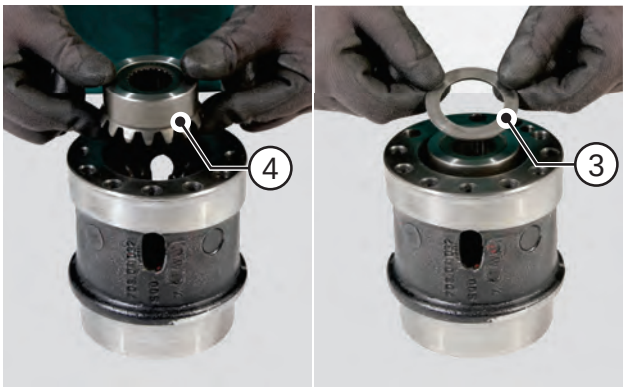


FIGURE 35: Insert planetary gear (4) together with washer (3).

FIGURE 36: Position the crown (2) on the differential carrier and lock it with screws (1).

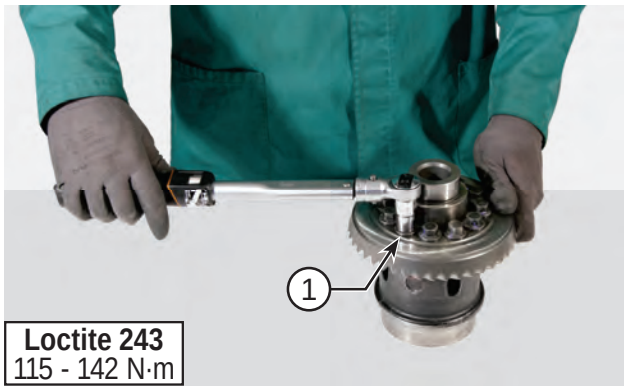


FIGURE 37: Install only new screws (1) pre-treated with locking adhesive using the criss-cross method.
Torque wrench setting: 115 - 142 N·m.

FIGURE 38: Insert and substitute, if necessary, the discs (13, 14) of the differential lock.

⚠CAUTION

First and last disc must be of steel material.

FIGURE 39: Install the snap ring (15).

⚠WARNING

Personal injury can result when installing snap ring.
The appropriate safety equipment must be worn.
To avoid injury to your eyes, wear protective glasses during this procedure.

NOTE:

Make sure the ring is properly set in its seat.

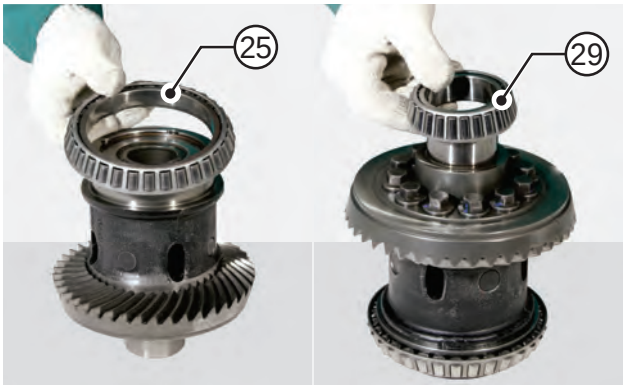


FIGURE 40: Heat the bearings (25, 29) to approximately 212 °F [100 °C] and fit into the differential box (12).

NOTE:

Once the bearing has cooled down, lightly lubricate bearing (25, 29) with SAE85W90 oil.

FIGURE 41: Install the complete differential unit.

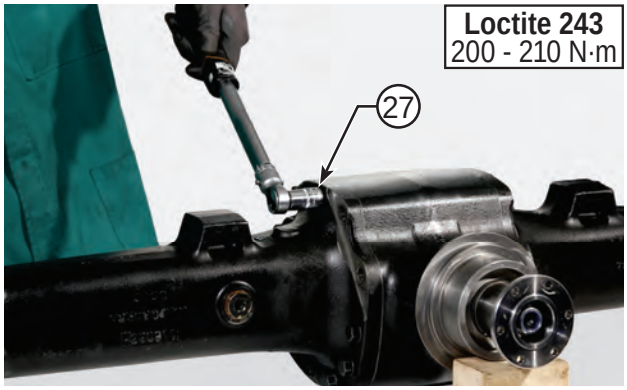
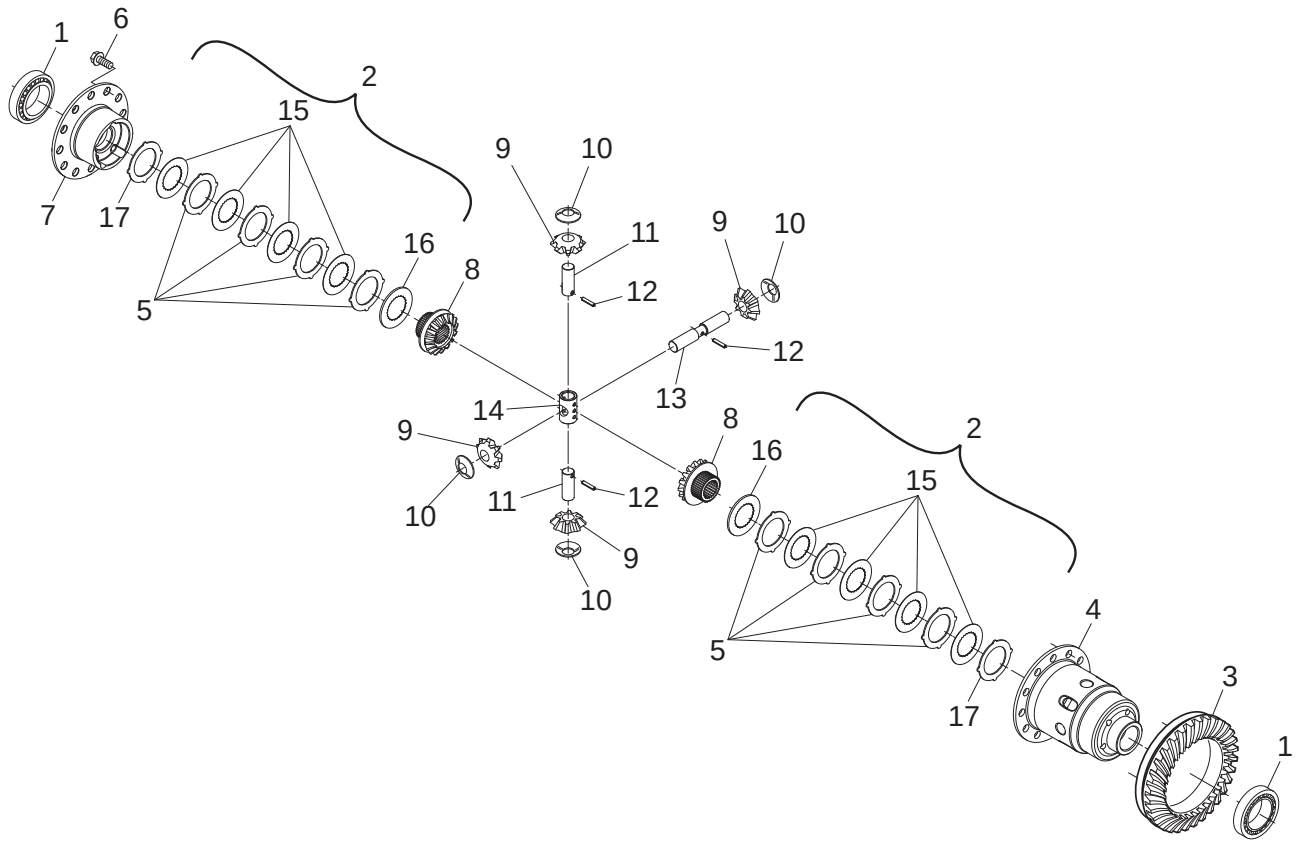


FIGURE 42: Insert a new o-ring on the centering diameter of the arm.
Position the arm on the central body.
Tighten nuts (27) in two stages, using the criss-cross method.

LIMITED SLIP DIFFERENTIAL UNIT

EXPLODED VIEW



DISASSEMBLY

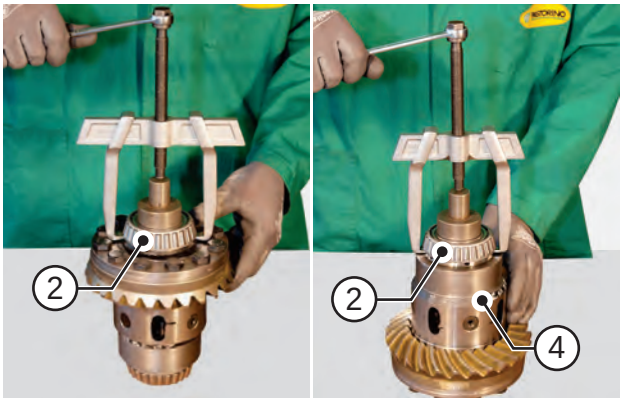


FIGURE 1: If the bearing need replacing, extract the bearings (2) from the differential carrier (4).

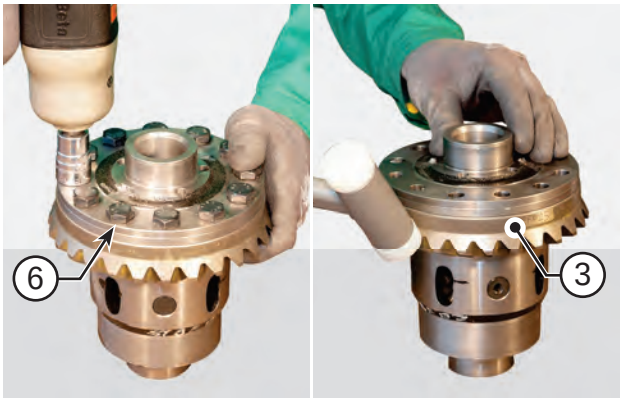


FIGURE 2: Remove the capscrews (6) from the crown (3). Use a plastic mallet to detach the ring gear (3) from the differential assembly.

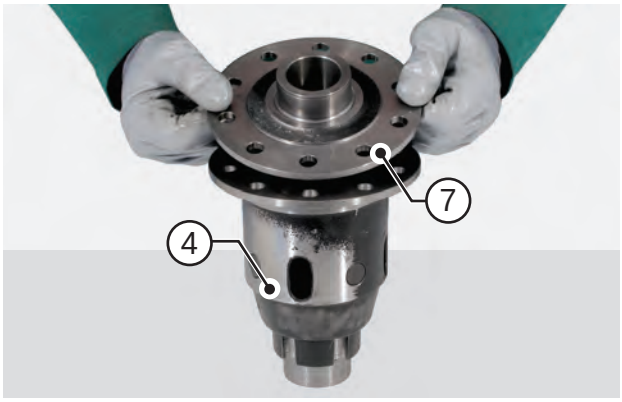


FIGURE 3: Using a plastic hammer, take the half box (4, 7) to pieces.

FIGURE 4: Remove the planetary gear (8) and the whole friction assembly concerned.

FIGURE 5: Remove the three spider blocking pins (12) by using a pin driver. Move the two opposite mounted short bolts (11) to the outside of the box using the same pin driver.

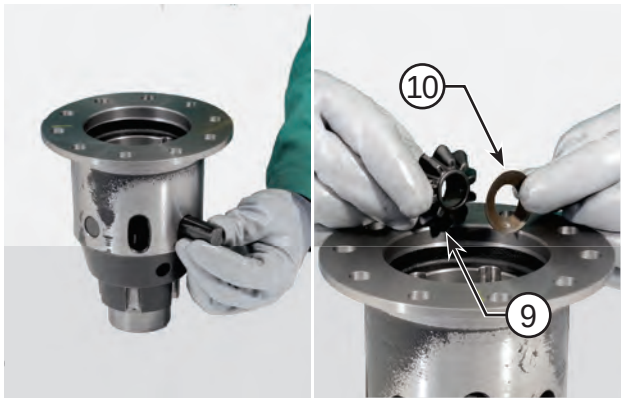


FIGURE 6: Remove the two half bolts (11), spherical washers (10) and satellite wheels (9).

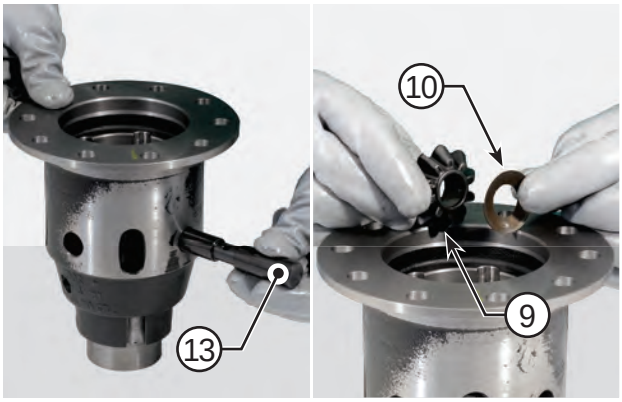


FIGURE 7: Remove the bolts (13) with the help of a drift and spherical washers (10) and satellite wheels (9).

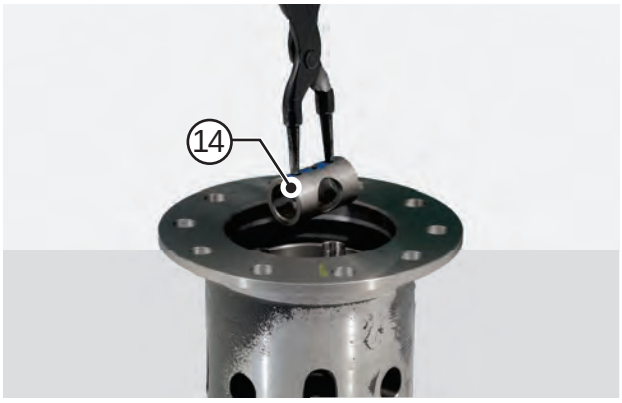


FIGURE 8: Remove the cross bolts (14).

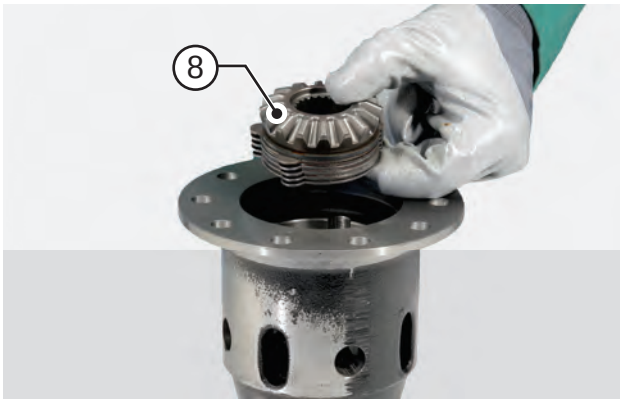


FIGURE 9: Remove the planetary gear (8) and the whole friction assembly (2) concerned.

ASSEMBLY

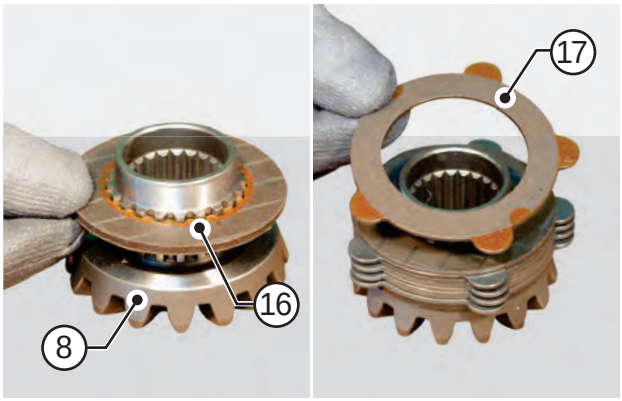


FIGURE 10: As to ring (16), the side without notches must face outwards.

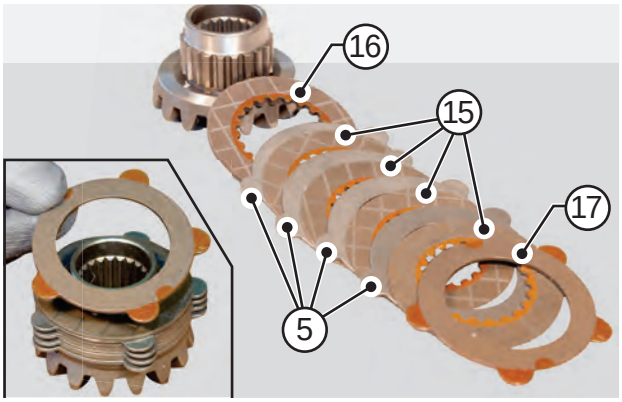


FIGURE 11: FRICTION UNIT COMPOSITION
Friction discs with increased shim (16), steel discs (5) and friction discs (15) alternated, end disc (17).

FIGURE 12: Place a friction unit (2) and planetary gear (8) into the half-box (4).

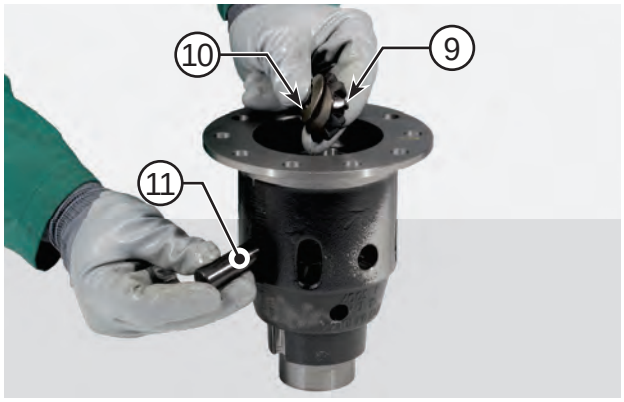


FIGURE 13: Insert the two half bolts (11), spherical washers (10) and satellite wheels (9).

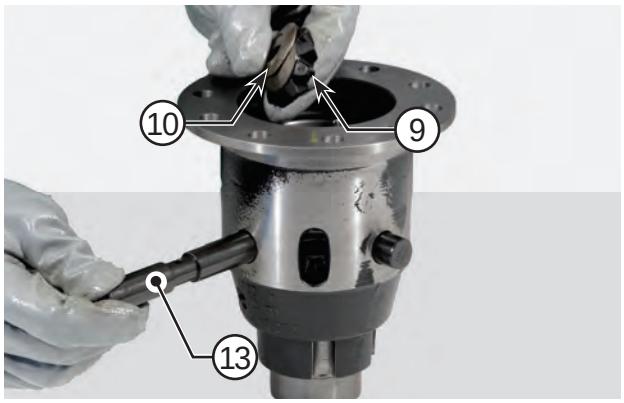


FIGURE 14: Partially insert the long bolt (13), satellite wheels (9) and spherical washers (10).

FIGURE 15: Place the planetary (9) and the spherical washer (10) in the box and fix with a fake pin of suitable diameter.

FIGURE 16: Insert the crossbolt (14) in the correct position.

FIGURE 19: Insert pins (12) to end of stroke.

FIGURE 17: Satellite wheels (9), spherical washers (10) and completely insert the long bolt (13).

FIGURE 20: Place a friction unit and planetary gear (8) into the half-box (4).

FIGURE 18: Bring the pin holes in line with the help of a pin-driver.

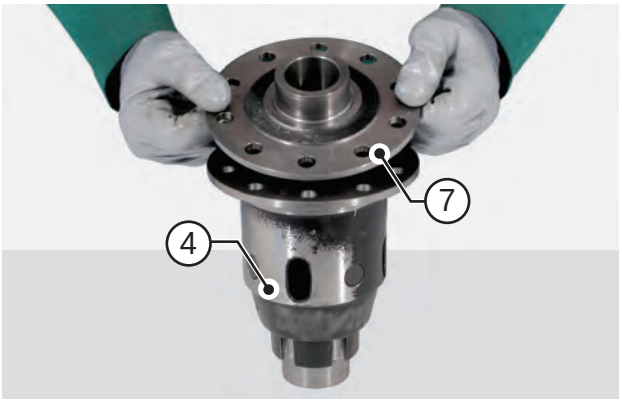


FIGURE 21: Mount the locking half-box (7) onto the half-box (4).

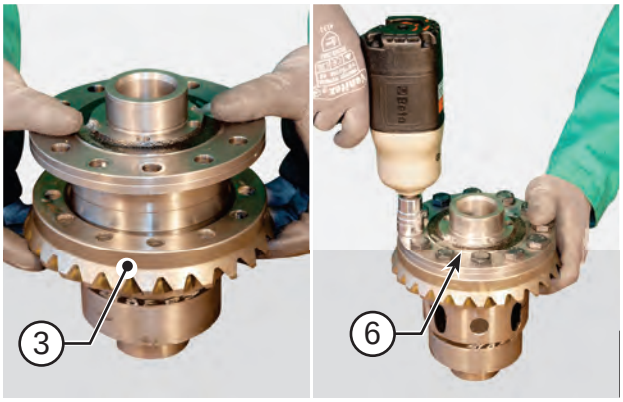


FIGURE 22: Mount the gear ring (3) and fasten it to the differential box with screws (6).

⚠CAUTION

Use only new screws.

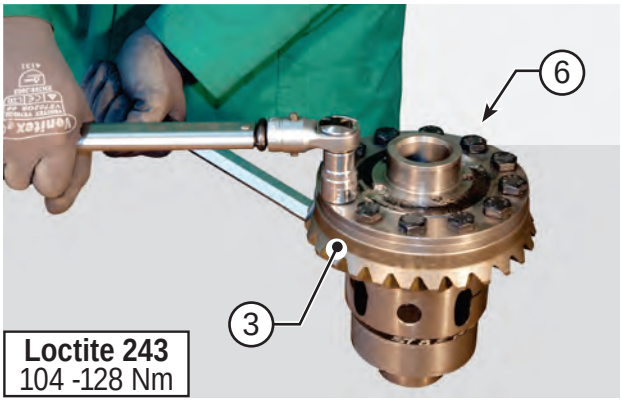


FIGURE 23: Lock the half box with screws (6) coated with Loctite 243.
Lock the gear ring (3) by tightening the screws (6) to a torque of 104 - 128 N·m.
Use the alternate and criss-cross tightening method.

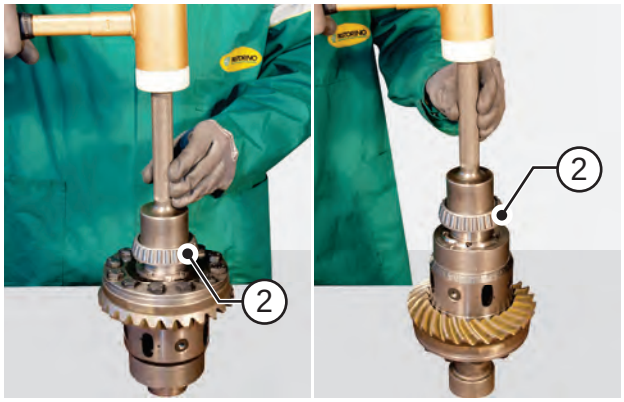
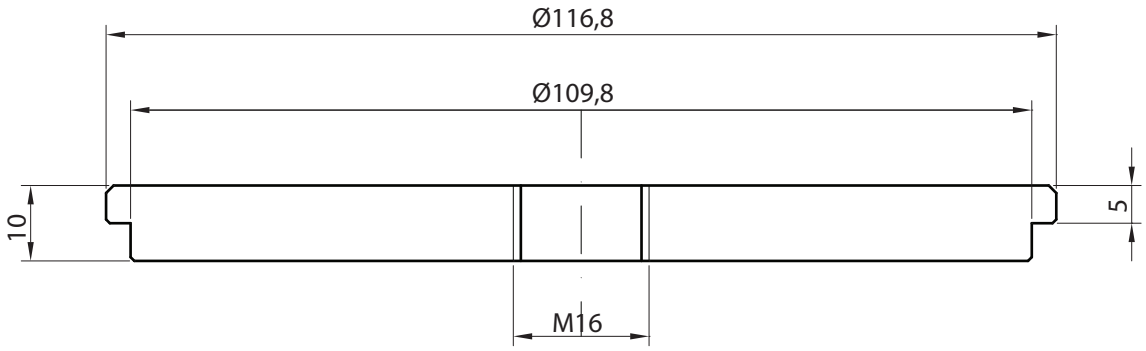


FIGURE 24: Using a driver with an adequate diameter, install the fi rst bearing (2).
Turn the unit upside down and install the second bearing (2).

SPECIAL TOOLS

T1



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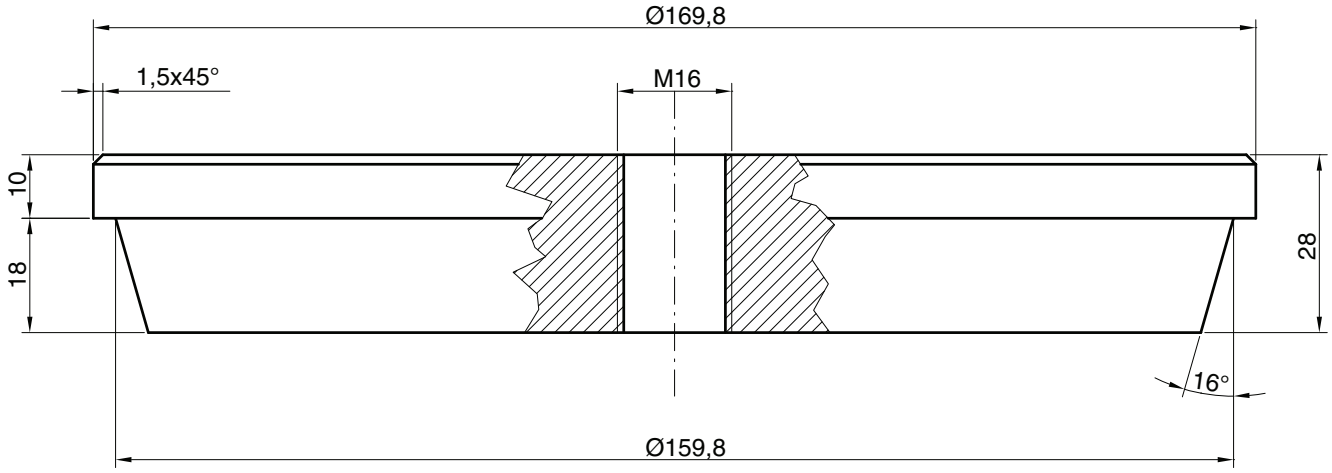
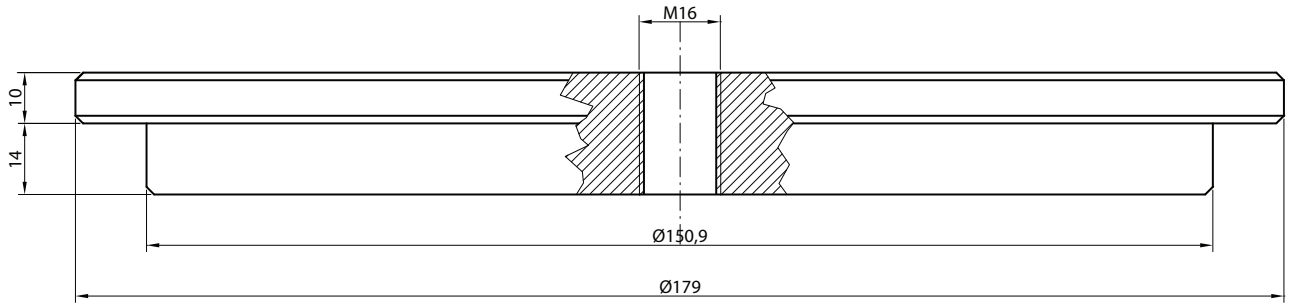
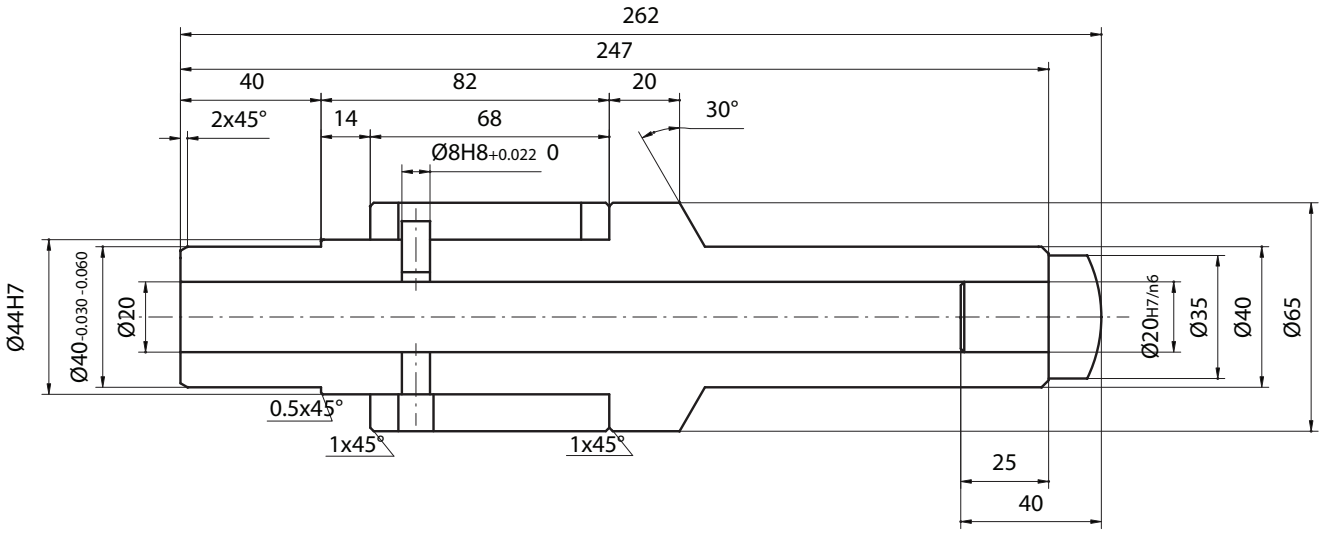
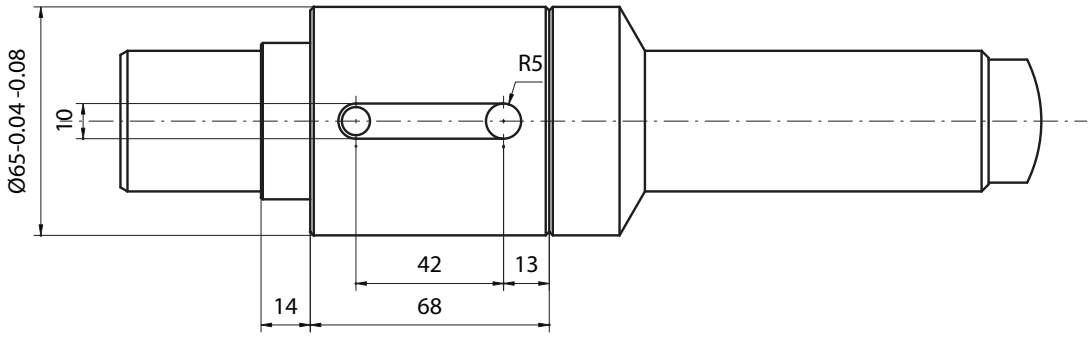


T3

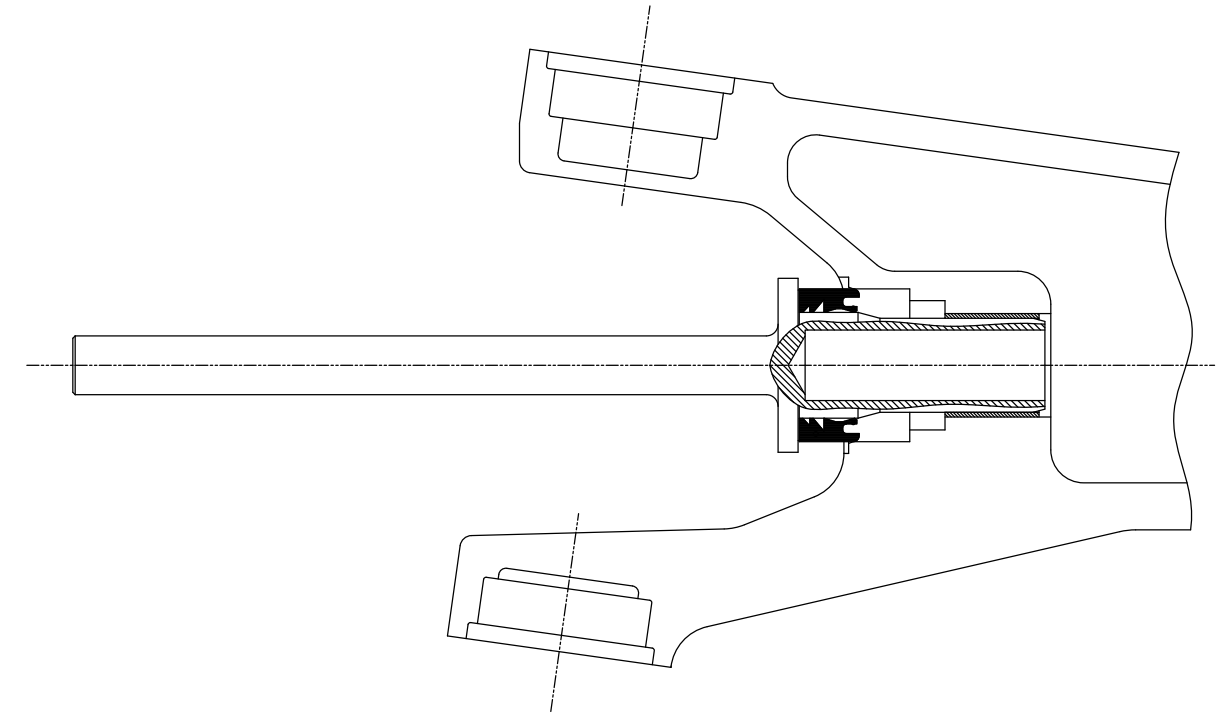


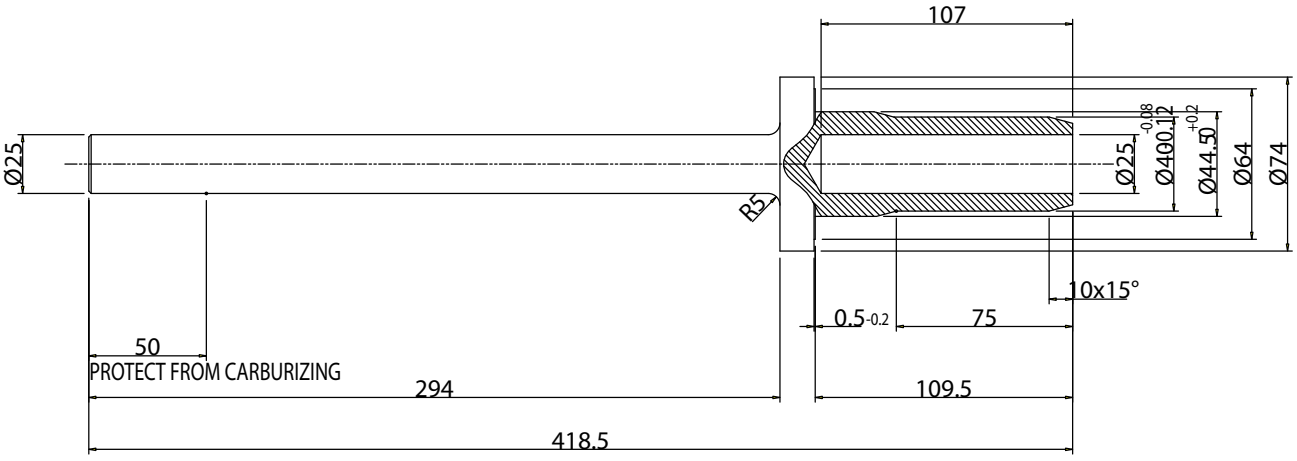
T4


262
247
40
82
20
2x45°
14
68
30°
Ø8H8+0.022 0
Ø44H7
Ø40-0.030 -0.060
Ø20
Ø20H7/n6
Ø35
Ø40
Ø65
0.5x45°
1x45°
1x45°
25
40

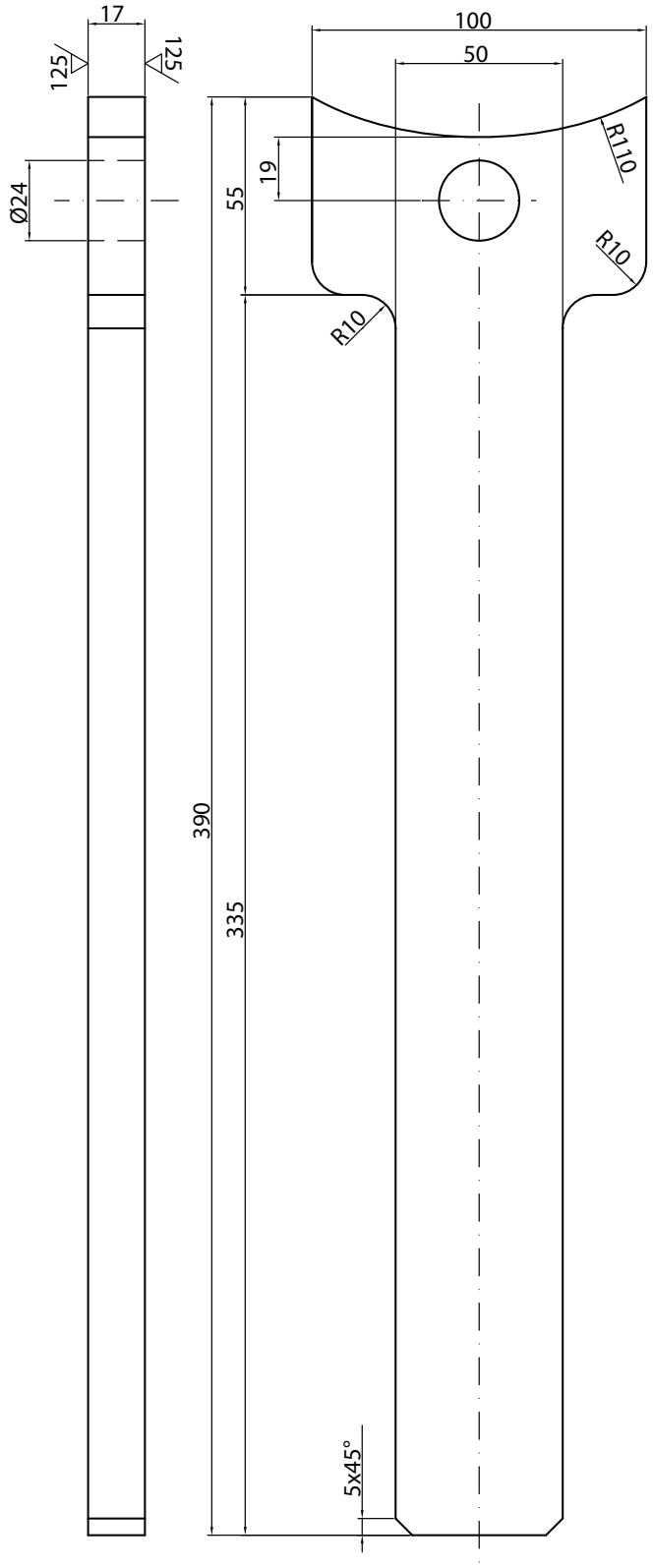

Ø65-0.04 -0.08
10
R5
42
13
14
68

T5

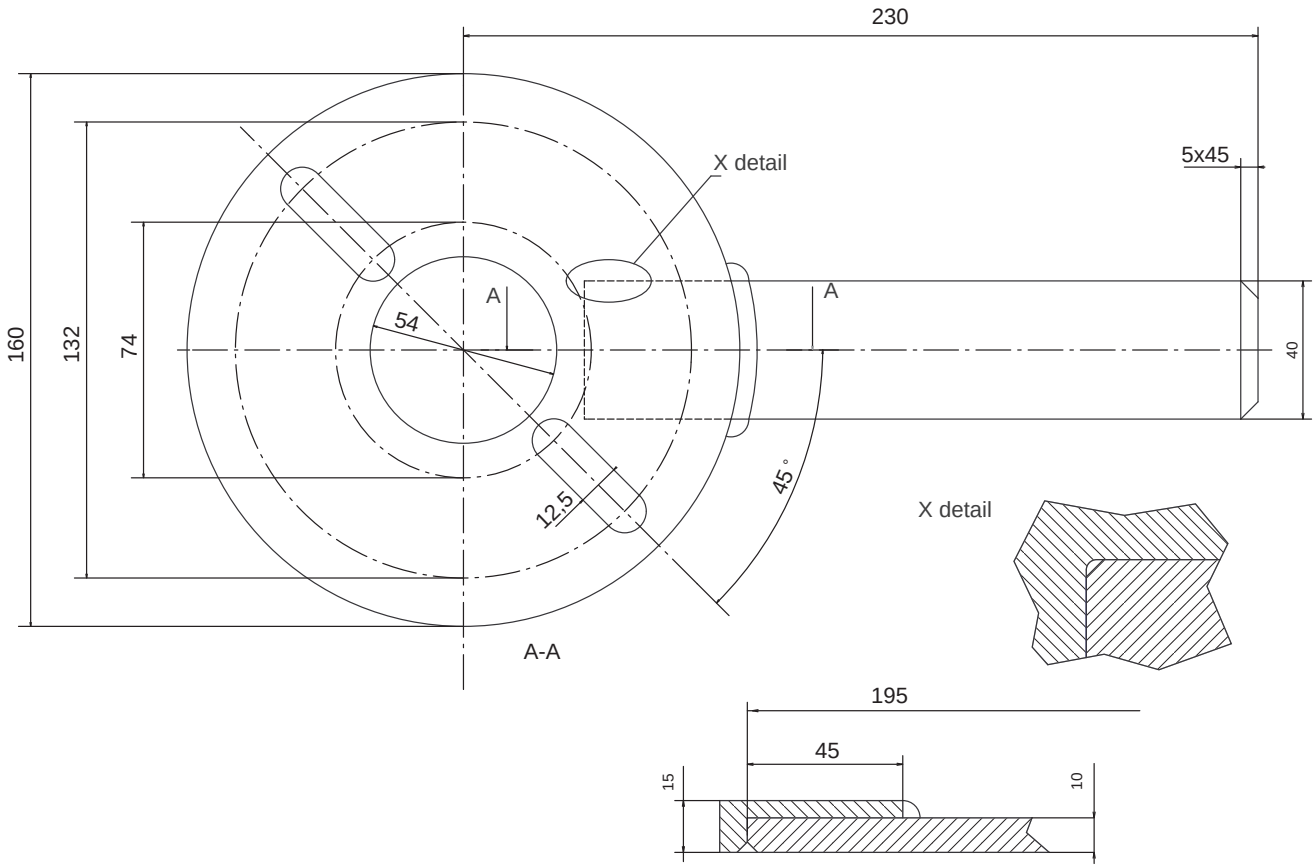



107
Ø25
R5
Ø25
Ø40 -0.08 -0.12
Ø44.50 +0.2
Ø64
Ø74
10x15°
0.5 -0.2
75
50
PROTECT FROM CARBURIZING
294
109.5
418.5

T6



T7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A
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160
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74
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X detail
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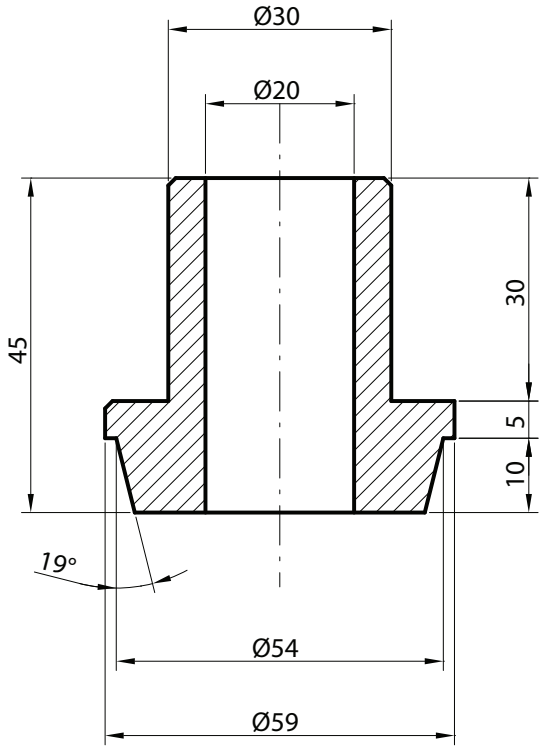
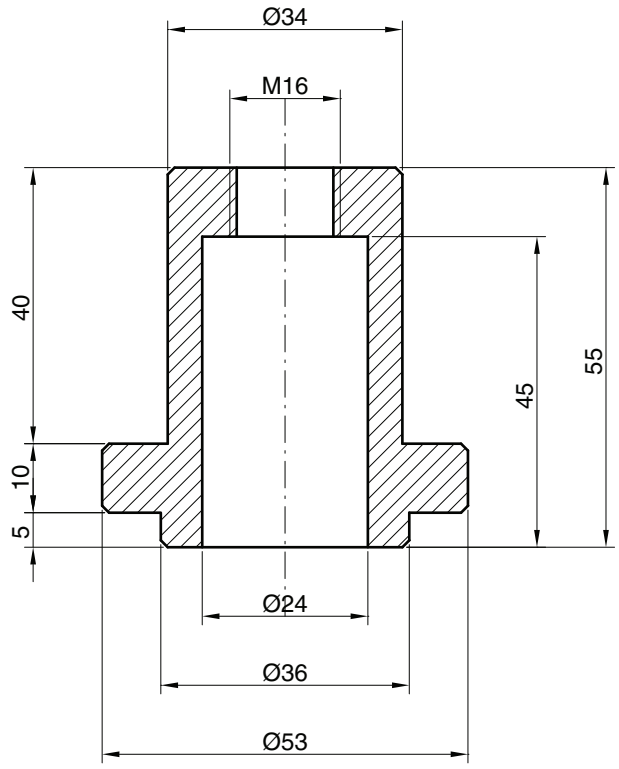
T8



T9



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